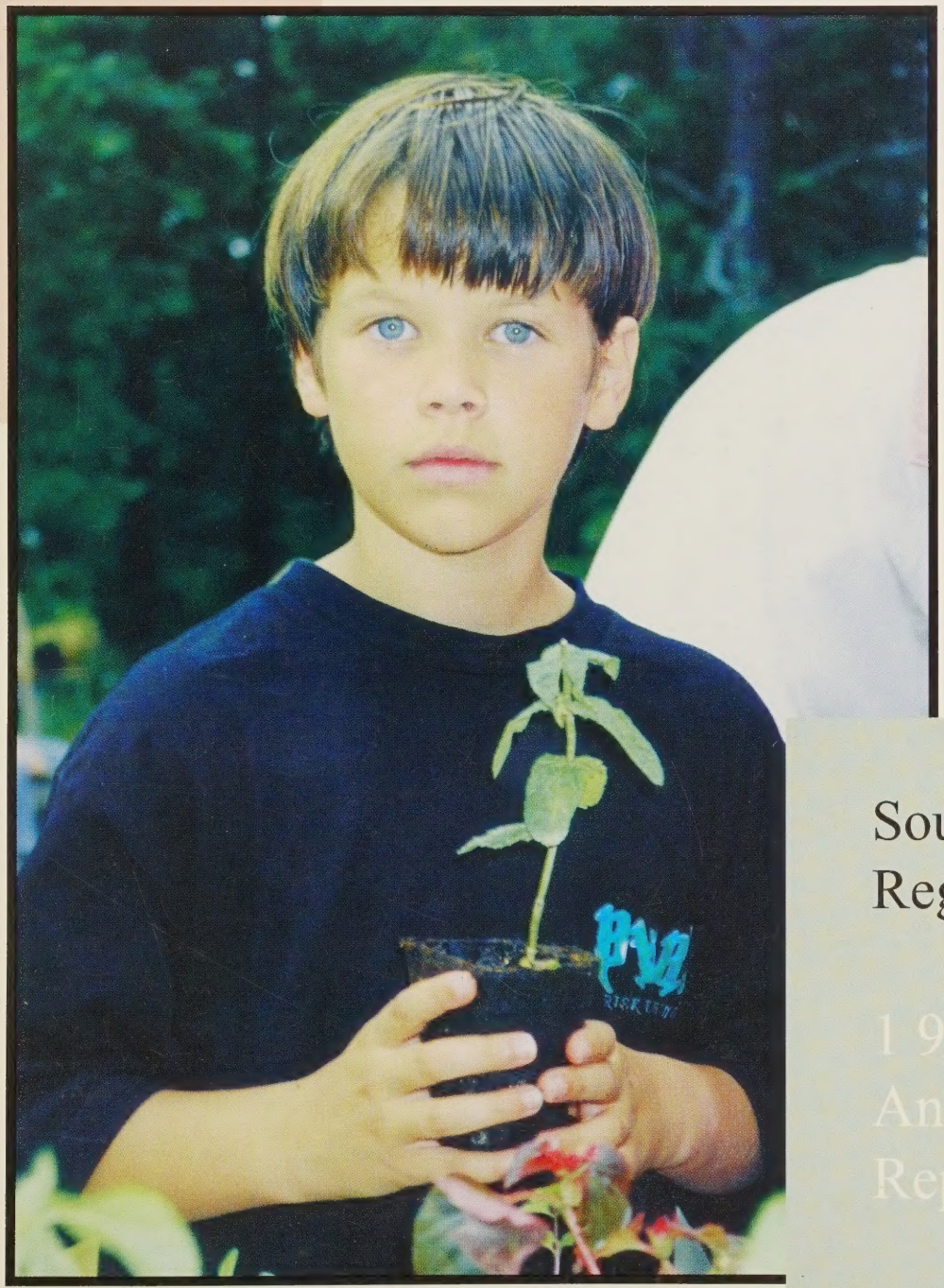
Sustainable Agriculture Research & Education

SARE

Sustainable Agriculture Research and Education
SOUTHERN REGION



Southern Region

1998 Annual Report

Sharon Lawson displays one of her goat cheddar cheeses. The Lawson farm is just one of several cooperators in the Hometown Creamery Revival, a SARE-funded project to help dairy farmers add value and market their products. Photo by project coordinator Vicki Dunaway. (LS97-83)

Technicians at Texas Tech University measure for drip irrigation in paddocks where conventional continuous cotton and forage-livestock systems will be compared to an integrated cotton/forage/livestock system in the High Plains. Photo by project coordinator Vivian Allen. (LS97-82)

Researchers from North Carolina A&T University and Virginia State University check the progress of seedless watermelons that are being grown in rotation with fall lettuce crops and green manures. Photo by Kanglin Li. (LS96-77)

Lee Maddox of the Tennessee Farm Bureau, interviews dairy farmer Dane Mercer in Sweetwater about the sustainable techniques adopted on his farm. Photo by Korina Wilbert. (LS95-68)

As part of the Professional Development Program state plan implementation, farmers in Puerto Rico learn how to prepare compost at a workshop held on Harmony Farm in Jayaya County. Photo by Juan Jose Sainz.

Researchers and farmers are evaluating the effects of various green manures and mulches in the production of culinary herbs for restaurant markets in the Virgin Islands. (LS-96-75)

(Front cover) Alexander Peletz accepts a seedling from an herb farmer at an old-fashioned seed swap hosted by the Southern Seed Legacy Project, whose goals are to pass down knowledge, appreciation and seeds to future generations of growers. Photo by Gwen Roland (LS96-78).

Table of Contents

What is SARE?

SARE was initiated in 1988 and is currently authorized under Chapters One and Three, subtitle B of title XVI of the Food, Agriculture, Conservation and Trade Act of 1990 (FACTA) to promote research and education that expands knowledge about sustainable agriculture systems.

The mission of the SARE program is to stimulate research and education activities that will increase knowledge and extend information about sustainable agricultural systems.

SARE funds three types of projects:

Research and Education Projects were the original recipients of SARE funds in 1988. These generally are led by interdisciplinary, multi-institutional, multi-state research teams that include farmers as participants. These projects are administered jointly by the University of Georgia and Fort Valley State University.

Producer Grants were started in 1994 to take advantage of producer experience and knowledge. These projects are designed and conducted by producers. Funded for up to $10,000, they are generally located in one state, often on one farm. These projects are administered jointly by the University of Georgia and Fort Valley State University.

Professional Development Projects were implemented in 1994 to train agricultural information providers in sustainable agriculture techniques and concepts. These projects are administered by North Carolina State University, ATTRA and North Carolina A & T University.

Forging closer links

Southern SARE's administrative council, management entity and staff are pleased to share our significant achievements with you through this annual report. The report highlights accomplishments of the Research and Education Program, the Producer Grant Program and the Professional Development Program (PDP).

We strive to improve our efficiency and responsiveness in meeting the needs of southern agriculture by embracing diversity, supporting good science and communicating with our many stakeholders. In these areas, I am proud to report that we made some noteworthy accomplishments. The two central goals for 1998 were: the integration of the Research and Education Program and the Professional Development Program into a comprehensive sustainable agricultural program; and closer coordination of the research and extension elements of the program, overall.

With SARE celebrating its ten-year anniversary, it was felt that there should be many successful SARE-sponsored projects throughout the region that other researchers could replicate. Such replication would introduce successful farming practices to other parts of the region. To this end, 1998 marked the first year that a successful proposal to the Professional Development Program was built on the foundation of a completed Research and Education project. See pages 12 and 97 for summaries of the two projects.

Improved communication and coordination between the two programs required some administrative structural adjustments. I am tremendously pleased to report that for the first time, each program's administrative team was expanded to include two members from the other's team.

Another accomplishment is in keeping with the 1998 USDA commitment to small farms. The administrative council evaluated the types of projects funded in the research and education portfolio, and felt a need to allocate funds to increase opportunities for institutions to submit quality small-scale agricultural proposals.

We are pleased to serve as stewards of the Southern SARE resources as we work toward sustainable development. We hope that you find this information useful as you continue your important work in sustainable agriculture.

Sincerely,

Adell Brown, Ph.D.
1998 and 1999 Chair
SARE Administrative Council

Research and Education Project Summaries

SARE
Sustainable Agriculture Research and Education
Southern Region

LS93-53
Final Report
December 1998

Sustainable Whole Farm Grain/Silage Production Systems for the Southeast

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SARE grant $640,290

Objectives

1.) Develop profitable alternatives, using white lupin, tropical corn, and hybrid pearl millet to current grain and silage production systems employed by farmers in the Southeast.

2.) Develop sustainable systems utilizing these alternative crops that integrate into diversified (crop/livestock) farming systems and result in reduced pesticide and fertilizer inputs and conservation of soil, water and energy.

3.) Determine the profitability of production systems using these alternative crops as compared to traditional systems currently employed by farmers in the Southeast and disseminate this information to farmers through farm meetings, popular press articles, extension publications, videos and television.

Approach

Sustained economic viability and environmental quality of farms in the Southern Region can be improved by diversified whole farm systems that effectively integrate livestock and cropping systems. This project, conducted from June 1993 through April 1998, attempted to determine the potential of new systems, utilizing new or improved crop species adapted to the region, i.e., tropical corn (*Zea mays* L.), hybrid pearl millet [*Pennisetum glaucum* (L.) R. Br.], and white lupin (*Lupinus albus* L.), that are adapted to the unique edaphic and climatological conditions of the humid South.

In summary, data indicated that:

i) Wheat yields demonstrated a variable response to previous summer rotation crop, but were generally greater following soybean. However, equivalent yields were obtained following millet and tropical corn, provided the summer grain crops were fertilized with 120 to 180 lb N/acre;

ii) Soybean yields were reduced from 11 to 23% following lupin;

iii) Lupin silage averaged from 2.4 to 11.8 tons (35% DM) and grain yields averaged 0 to 34 bu/acre. The experimental design and N balance objectives required that lupin be grown in the same plots every year.

Diseases, especially anthracnose *(Colletotrichum gloeosporioides)* and brown spot (*Pleiochaeta setosa*), were increased by the lack of rotation. Optimum planting time for lupin is 4 weeks before the first 28 °F freeze in fall.

Lupin (even failed crops) demonstrated a positive rotation and N response for tropical corn and millet. Lupin are relatively insensitive to acid soils but respond to adequate P fertilization. Lupin as a green manure supplied sufficient N for a 20.5 tons/acre silage crop of tropical corn;

iv) tropical corn silage ranged from 4.9 to 26.8 tons/acre, dependent on previous crop and N fertilizer rate. Grain yields ranged from 24 to 100 bu/acre;

v) Millet silage yields ranged from 4.3 to 27.5 tons/A, dependent on location, N rate and previous crop. Following wheat, 120 to 180 lb N/acre was required for maximum yields. (54 bu/A). Dependent on location, previous crop, and N rate, millet grain yields ranged from 15 to 129 bu/acre. Millet yields were up to 43% greater following lupin than wheat. Bird predation is a problem on small acreages. Millet yields were greater when drilled. Optimum pH is 6.0-6.5 for millet and millet responds to high levels of soil P;

vi) All three crops can be ensiled satisfactorily. Tropical corn and millet silage had similar energy and protein content to temperate corn silage and lupin silage was lower in energy but higher in protein than other silages. Dairy cows on lupin silage based diets had the same milk production as those on temperate corn silage diets while cows on millet and tropical corn diets produced less milk. Our results show that pearl millet is a potential silage crop and a viable feed grain crop for double-cropping systems in the southern USA.

A new race of rust in 1993 curtailed late plantings of the crop, one of its strong points. A good multi-gene resistance to this race of rust has been developed and a new rust resistant hybrid with even greater grain yield potential than the variety used in this study (HGM-100) is scheduled to be commercially released, probably in 1999.

Impact

As a result in part from this project and satellite projects, there is a tremendous amount of interest in using lupin as a cover crop for cotton production in the Florida panhandle, southern Georgia and Alabama, South Carolina and North Carolina.

Resource Seeds (Visalia, CA) is currently in-

creasing a high alkaloid selection from 'Tifwhite-78' (a USDA-ARS release) white lupin seed for this purpose.

The Auburn University cooperator, Edzard van Santen, is also increasing seed of a selection of high alkaloid 'Tifwhite-78' lupin to be used as a cover crop. A high alkaloid type would be a better choice for a cover crop/green manure in that alkaloids protect the plants from pests and some diseases.

Also, there is research to indicate that high alkaloid lupin may suppress certain nematodes.

Also, due to our efforts, Agicultural Resources International Seed Technology Division, Swedesboro, NJ, obtained distribution rights in the USA to market 'Lunoble' and 'Lumineux' white lupin from Agri-Obtentions, the seed company in France, which owns proprietary rights to these varieties. We furnished seed to the company for seed increase in September of 1997.

Based on public response to articles on background research for this SARE project, the use of lupin in products for human consumption is an area that should receive further research interest. The public seems to be keenly interested in this topic and a human food market would increase the value of the crop, making it more profitable for farmers to grow.

Also, from observations that arose out of our research there is considerable interest in lupin seed to be used for wildlife food plots. This potential is being currently being investigated by an Auburn University wildlife biologist.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS94-60
LS95-60.1
Final Report
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Animal Waste, Winter Cover Crops and Biological Antagonists for Sustained Management of Nematodes on Cotton

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SARE grant $ 143,412

Plant-parasitic nematodes are limiting factors in cotton and other crop-production systems in the southern United States. These parasites restrict root growth and development, resulting in a general stunting of the plant and poor yields. Poor root development prevents the plant from adequately interfacing with the soil for mineral nutrition and moisture. In addition to losses in cotton yield, the inability of the plant to utilize available nutrients and moisture may result in these nutrients and/or pesticides moving into ground or surface waters and thus becoming pollutants.

Demands for poultry and pork have fostered a rapid expansion of these animal husbandry operations in the Southeast, including North Carolina. Modern techniques for animal production result in the accumulation of large quantities of waste materials in small areas in rural communities. These waste products are of major concern as sources of surface and groundwater pollution. Poultry litter contains relatively high levels of nitrogen, phosphorus, and potassium. The use of manures/litter with high-nutrient levels in lieu of chemical fertilizers is an environmentally sound method of supplying necessary nutrients to cotton while disposing of this waste product. The ammonia in animal wastes, including poultry litter, generally acts like slow-release fertilizers and can thus inhibit nematodes while supplying the plant with nitrogen in a safe manner.

A common practice in southern row-crop agriculture in the sowing of a winter cover crop to prevent soil erosion. A winter rye crop in particular is beneficial in that it suppresses the population levels of many parasitic nematodes. The influence of other winter cover crops, such as vetch, canola, and other small grains on different plant-parasitic nematodes is poorly understood. The use of winter crops also is valuable in protecting the environment since they can scavenge nutrients left from the previous crop, prevent these nutrients from moving off site, improve soil tilth, and are an important component in conservation tillage.

Addition of animal waste products to the soil and the use of winter cover crops, that are commonly grown to prevent soil erosion, are generally beneficial because they increase the organic matter content of the soil. Increasing the level of organic material in these soils improves their nutrient- and moisture-retention properties that favors the plant. Enhanced microbial activity, a result of the application of animal waste products and/or winter cover crops, can provide for an environment where antagonists of plant-parasitic nematodes, especially certain bacteria and fungi, can aid in suppressing these pests. Many of the plant-growth-promoting rhizobacteria associated with certain cover crops, especially legumes, may induce systemic acquired resistance to nematodes and other plant pathogens. All of the aforementioned factors serve to enhance sustainability of agricultural production by providing for an improved agroecosystem. Potential reductions in costly inputs used by farmers can limit their reliance on petroleum-based products for pest control and/or chemical fertilizer.

Objectives

1.) Evaluate the effects of the rate of poultry manure and litter, and municipal-waste compost singly and in combination with winter-cover crops and selected nematode antagonists for control of plant-parasitic nematodes on cotton; 2.) Determine the potential advantages of organic sources of nitrogen versus standard fertilizers on nitrogen use efficiency and potential environmental impacts; and 3.) Incorporate findings into a sustainable cotton- and associated crop-production systems through a series of farmer-managed demonstration tests, tours, cotton production meetings, and extension publications.

Approach

A combination of greenhouse, microplot, and field research plots were used to evaluate a winter rye cover crop with or without poultry litter and fungi for management of root-knot, sting, Columbia lance, stubby-root and reniform nematodes in cotton. All experiments were replicated to permit statistical analysis of the results. Twenty field research experiments, fifteen in growers fields and three on experiment stations, were utilized as field laboratories. The field plots also served an educational function in that they were featured in research tours and the 1997 North

Carolina Cotton Field Day to inform farmers about this work. Greenhouse and small plot tests were conducted in order to more precisely quantify the effects of selected nematode antagonists and green manure crops on these biological systems. This information has been and will continue to be disseminated to extension personnel, farmers and the general public.

About five thousand soil samples were collected over 3.5 years to measure the impact of various treatments on communities of plant-parasitic nematodes. Nutrient levels of both soil from test sites as well as poultry litter were processed to assess the effects of these variables on the agroecosystems studied. Other measurements included cotton yield, numbers of nonparasitic potentially beneficial nematodes at several sites, activity of biocontrol agents, and assessments of the cover crops.

Results

Field experiments clearly demonstrated the benefits of application of poultry litter for management of plant-parasitic nematodes in cotton. Poultry litter was highly efficacious in suppressing population densities of root-knot, Columbia lance, stubby-root, sting, and lesion nematodes in field soils and in other experimental systems. The inclusion of fungi and bacteria that parasitize these nematodes was only marginally effective in suppressing numbers of these plant-pathogens. A rye cover crop also was effective in suppressing root-knot and Columbia lance nematodes, especially when incorporated in late spring or left on the soil surface in a no-till system. Incorporation of a rye cover crop tended to suppress other plant-parasitic nematodes such as reniform and stubby root nematodes in greenhouse and microplot tests. Three soil amendments (poultry litter and/or a rye cover crop) also resulted in the build-up of beneficial nematodes that feed on soil bacteria and fungi. In microplots, the combinations of rye and poultry litter resulted in the highest cotton yield (up to 68% increase over control) while greatly suppressing root-gall development and enhancing the reproduction of microbivorous nematodes. The 1997 results with rye, and other small grains, however, showed that some root-knot nematode populations, including race 4 of *M. incognita*, can reproduce on certain small grains. An extensive study focused on the identification and quantification of various organic acids formed during the decomposition of rye. Formic, acetic, propionic, butyric and valeric acids in soil solutions were monitored. Acetic and formic acids were detected by means of ion exclusion chromatography, primarily in the first 24 hours and at concentrations less than 20 F/L. Although low molecular weight organic acids may be involved in the control of nematodes when rye is incorporated into soil, they singularly do not appear to be the primary mode of action.

Impact of Results

Cotton growers in the southern region are highly innovative and receptive to implementing new and or developing technologies. The application of animal manures is especially attractive since it can reduce the need for expensive commercial fertilizers. Similarly, many farmers are utilizing cover crops, and this practice will be adopted with increasing frequency as they learn that a cover crop can alleviate stress on cotton due to nematode problems. The use of cover crops to improve overall nematode management is especially appropriate, since interest in conservation tillage is increasing. Cover crops not only contribute to nematode management, but may aid in preventing off-site movement of nutrients and minimize inputs of soil-applied herbicides. This project thus serves to illustrate to growers the benefits of sustainable approaches to cotton production.

Contribution

The use of poultry litter to manage nematode pests of cotton and promote soil health provides a method of biorational pest control. This practice can also reduce the rates of application of chemical pesticides and fertilizers. Thus, the proper selection and management of winter cover crops and animal waste can enhance pest management programs, scavenge surplus nutrients that would otherwise move into ground and surface waters, improve soil health, enhance soil moisture retention in porous soils, and also prevent erosion of top soils. All of the aforementioned factors can enhance sustainability of agricultural production by providing a better and healthier agroecosystem. Potential reductions in costly inputs used by farmers can reduce their reliance on petroleum based products for pest control and or energy intensive fertilizer products. Reduced reliance on these products also serves to protect water and air quality, thus improving the environment.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS94-61
Final Report
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Integrating Sustainable Forestry into the Whole Farm Management of Minority and Limited Resource Landowners in Two Regions of Arkansas

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SARE grant $246,710

Traditionally, forestry extension has not been as effective as agricultural extension in disseminating information to landowners. Small landowners, or farmers with small woodlands, tend to be unaware of the value and methods to sustainably manage and harvest their timber and non-timber forest products.

An innovative effort between Winrock International, The Nature Conservancy, Arkansas, Ozark Foothills Resource Conservation and Development Council (RC&D), and the Arkansas Land and Farm Development Council (ALFDC) has educated non-industrial forest owners of the value of their timber and to emphasize the need to seek professional advice before cutting trees. The working hypothesis for this project is if landowners realize their trees have value which increases over time, they will be less likely to clear cut their forests, will sustainably manage their forests, and will be more likely to plant trees as an investment. Through the education of landowners, this project attempts to increase landowners' income while improving the hardwood ecosystem.

This pilot-research project initiated collaboration between government and nongovernmental agencies, private foresters, and landowners to increase awareness of the value of hardwood timberland. Two areas of Arkansas have been the focus: the Mississippi Delta Region and the Ozark Foothills. Both regions are rural and have limited economic opportunities. Poverty is prevalent and individuals have the potential to make money from the sale of their timber.

This project follows an "action research" model which monitors the process as well as the results. Since all social interventions are experiments, understanding the success or failure of approaches can be as important as understanding the impact. If a participatory approach succeeds in the Delta, then a similar project can be replicated in other areas. In addition, by constant monitoring and evaluation, the approach can be changed or adaptively managed, to achieve the desired results.

The project is testing the following two assumptions:

1.) Educating landowners about management and harvesting options will increase their income and encourage sustainable management and;

2.) Participatory approaches are the most effective way to educate landowners in the Delta and the Foothill ecosystems.

Objectives

Winrock and its partners see the process and the results of this project as important components in understanding social, economic, and ecological changes in both regions. The objectives of this project as outlined in the original proposal are to:

Test participatory strategies to promote sustainable farm forestry in the Delta and Ozark Foothills regions;

Compare contexts and strategies to identify factors that influence effectiveness;

Engage limited-resource and minority landowners, community-based organizations, technical advisors, and policy makers to determine how to promote sustainable on-farm forest management;

Evaluate existing policies and programs; and

Recommend improved policies and programs.

Methods

The methods used to achieve the objectives are:

- Encourage interagency cooperation by establishing a working group and facilitating interagency activities;
- Develop informational material for the landowners;
- Conduct landowner workshops to promote sustainable hardwood forest management practices;
- Demonstrate land use options;
- Establish two forest landowner associations in the Ozark Foothills region; and
- Analyze the approaches and share results through a case study/issues paper.

Impact of this project will be evaluated by measuring the following indicators:

- Number of interagency working group meetings and collaborative efforts;
- Number and/or distribution of useful extension materials; Understanding the economic impact of various land-use options on marginal land in the Delta;

- Number of workshops convened and number of participants;
- Number landowner requests for assistance in managing timber;
- Number of site assessments conducted for private landowners;
- Development of forest demonstration site(s) and number of people who have toured the site(s); and
- Number of landowner associations, members, and types of activities.

Primary Results include:

- Three coordination meetings for representatives from collaborating agencies were held;
- Two Fact Sheets, one discussing how to receive the top dollar for your timber and the second discussion how to manage forest lands for wildlife;
- *Top Dollar For Your Trees*, an instructional video, was produced and will be distributed to 200 extension agents throughout the state;
- An analysis examining the economic return from growing hardwood forests on marginal lands in the Delta region was published and distributed;
- Six *Top Dollar for your Timber* landowner workshops were held attracting more than 435 participants;
- More than 100 requests for information on harvesting and timber management were received;
- Nine site assessments/evaluations were conducted by private consulting foresters;
- More than 200 people visited ALFDC's demonstration forest;
- Shiitake Market Research Study conducted;
- Demonstration Forest established that will show managment systems for three different ecosystems;
- The Ozark Woodland Owners Association was formed and conducted four meetings. Two newsletters were produced as was a woodland management video; and
- Case study of the project completed and distributed.

Impact

These activities have had an impact on government and nongovernmental agencies, private foresters, landowners, and the environment. The Arkansas Forestry Commission, the Natural Resource Conservation Service (NRCS), the Arkansas Forestry Association, and the Arkansas Cooperative Extension Service have incorporated the *Top Dollar for your Timber* workshop in their office activities. Collectively, these agencies have received more than 100 phone calls from people who are interested in selling their timber and heard about the workshop but were not able to attend. The NRCS and Cooperative Extension are referring clients to professional foresters and/or to the Forestry Commission for information about management plans. An NRCS office outside Arkansas has requested information about the *Top Dollar for your Timber* workshop so it can implement the workshop in that region.

Landowners who have hired private consultants have reaped economic benefits. One consultant has worked for seven landowners who chose to get a professional appraisal based on recommendations of the workshop. These landowners have or will increase their income by an average of 25 percent over earlier timber estimates. With the exception of one landowner, all will be cutting less timber than they would have based on their initial estimate.

In sum, landowners have become more aware of the value of their timber and have demonstrated an interest in managing their woodlands for the long-term.

Contributions

The contributions of this project for producers or consumers are not easy to measure. They may include increased sustainable forest management practices which will have both economic and environmental benefits. Landowners already have benefited from a greater economic return from their timber. Secondary wood processors will have access to high-quality, locally grown timber in the future. Landowners who sought professional woodland management advice have, in general, cut less timber than they would have without consultation. This results in unquantified environmental benefits to society including carbon sequestering, providing wildlife habitat, and reducing soil erosion.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS94-62
Progress Report
December 1998

Intercropping Small Grains and Lupin for Sustainable On-Farm Utilization

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SARE grant $143,151

Objectives

Agricultural enterprises depend on innovation to stay competitive and as the old saying goes 'necessity is the mother of invention'. Feed costs are the single largest cost item for dairy operations. Due to constant disease and pest pressure it is not economical to produce alfalfa in a large portion of the southern United States.

Alfalfa haylage and hay together with high quality corn silage are the basis of total mixed dairy rations in traditional dairy states such as Wisconsin, Michigan, and New York. We are developing binary mixtures of small grain (wheat, oat) and the large-seeded winter-annual lupin to address the need for a high quality base ration for dairy operations in the southern United States.

Results

We have demonstrated over the last three years that it is possible to produce 8 - 10 tons of pure lupin per acre silage (65% moisture)compared to 9-13 t/acre for mixed stands and 9-11 t/acre for pure wheat. Harvested at the right time - early bloom, this silage has very high quality.

Relative Feed Value (RFV) is often used as a measure to compare the quality of forage; full bloom alfalfa is assigned a value of 100. The relative feed value of the lupin leaf component is > 230 and lupin stem are approximately 130. The resulting total silage has a RFV exceeding 135 which is in the range found for corn silage made from corn with well developed ears.

Growing a small grain with the lupin rather than lupin in monoculture produces some desirable effects, among them enhanced survival of lupin seedling. Our research also shows that careful seedbed preparation is a must for successful lupin cultivation. Fall-seeded lupin is a very attractive deer browse in wildlife plo ts. Deer tended to consume lupin preferentially over all other forages offered to them. This fall, we have the first commercial lupin acreage in Alabama for seed production.

Fifteen acres were established in Central Alabama. Seed from this production will be used either in hog rations or sold to farmers to be used as a cover crop preceding cotton.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS94-63
Final Report
December 1998

Regional Center for Sustainable Dairy Farming

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The Regional Center for Sustainable Dairy Farming included a comprehensive comparison of two systems of dairy production; one based on intensively managed pasture, the other based on row crops and conventional confinement housing and feeding. We examined animal performance, health, seasonal reproduction, environmental, and economic impacts of the two systems. Outreach included dissemination of results to farmers, extension personnel, service industry personnel, students, and others as the project progressed.

NC State University's Lake Wheeler Road Field Laboratory was the location of the experimental portion. The teaching herd at NC A&T State University and cooperating producers in the region (VA, NC, SC) were resources for various demonstrations, pasture walks, field days and participated as advisors.

The project was based on use of groups of Jersey and Holstein cows assigned at calving to two feeding systems. At the start, we used 24 Holstein cows and 12 Jersey cows but later there were 18 Holsteins and 18 Jerseys in each treatment group replicate. A replicate consisted of either 36 spring calving (Jan. - Mar.) or 36 fall calving (Aug. - Oct.) cows on pasture and a similar group in confinement. Data collected include 4 spring-calving replicates and 3 fall-calving replicates. Cows were kept in respective systems through lactation but were grouped together elsewhere during non-lactating periods. Healthy cows that conceived were kept in the same treatment group for their next lactation.

The confinement system was a free-stall barn with an outside bare exercise lot. Rations included a blend of corn silage and/or haylage with various grains and by-product feeds and fed as a total mixed ration. Cows in the pasture system were kept on pasture except for supplemental grain feeding and for milking. When pasture was limiting, additional supplemental grain and by-products were fed and/or hay or hay-crop silage was offered.

The pasture was 37 approximately two-acre paddocks with combinations of perennial cool season and warm season grasses and legumes to allow for grazing throughout the year. Winter and summer annuals were used strategically. Each paddock was accessible from a 16' travel lane and included water.

Data included daily milk yields, weekly estimates of feed intakes, analyses of feeds and forages including fresh pasture, routine recording of udder infections (mastitis) and other health problems, weights and body condition scores of cows, reproductive information, and monthly concentrations of fat, protein, and somatic cells (udder health) in milk. Storm water runoff samples were collected from a 3-acre exercise lot and from drainage from about 22 acres of pasture area for nutrient and sediment analyses. Cow watches were conducted to estimate distribution of manure on pastures and the proportion of nutrients deposited in feeding and milking areas in contrast to pasture areas.

Milk production was higher ($P< .05$) for confinement-fed cows and seasonal averages differed by 9 to 16 % between subgroups. This meant reduced milk income for cows in the pasture system. Feed costs were lower for cows using pasture but that alone did not offset the difference in income. Jersey cows milked less than Holsteins and milk income over feed costs was also lower for Jerseys in both systems. Based on data from the project and a computer simulation model, one PhD dissertation examined differing stocking rates and supplementation strategies on pasture systems and projected that moderate to high stocking rates and high concentrate supplementation would improve the profitability of the pasture system. That projection did not consider potential effects on animal health or manure nutrient management.

Incidence of udder infections (mastitis) was higher for cows in confinement versus cows on pasture (42.2% vs. 22.8%, $P< .05$). There were also significant ($P< .05$) breed differences in incidence of mastitis with Holsteins at 41.1% vs. Jerseys at 23.9%. Adjustments for udder health and milk loss reduce differences in net production income for Holsteins over Jerseys and for the confinement system over grazing.

No differences due to treatment were observed in reproductive measures, but the pregnancy rate in a 75-day breeding period was numerically higher for cows on pasture. There were breeding efficiency advantages for Jersey cows over Holsteins in first service con-

ception rate, conception to all services, proportion of cows inseminated and overall pregnancy rate. Overall 75-day pregnancy rate was 84.2% for Jerseys compared to only 58.9% for Holsteins ($P< .05$).

Body weight changes and body condition scores have shown that cows in the pasture system were thinner (.2 to .6 points on a 5-point scale; $P <.05$) through the lactation.

All of the feces and urine of the confinement cows had to be handled or processed in some way. This requires special needs for handling, storage, and redistribution of nutrients to crop land or other uses. In contrast, 24-hour cow watches showed that 87% of urine events and 86% of feces events occur in or near paddocks where nutrients are recycled for pasture use. Therefore, a pasture-based system only needs storage and handling facilities for about 14% of manure plus milking facility wash water.

Nutrient runoff from the bare exercise lot had high concentrations of sediment and nutrients. Measures of carbon-oxygen demand and conductivity were also high for storm water runoff from that lot used by confinement cows (and other cows not on experiment). In contrast, such measures were significantly lower for runoff samples from pasture. The densely vegetated, rotationally grazed pasture was effectively retaining feces, urine, and soil on the field instead of washing away during storm events. Additional structures have been installed for runoff from the bare exercise lot to prevent nutrients and sediment from reaching the stream. Because of the runoff data, confinement cows are to be managed in the future using rotational vegetative lots for exercise.

In our environment, the pasture-based cows have lower housing and facility requirements and perhaps lower equipment needs. Both confinement and pasture systems have equipment needs that may vary depending on the size and scale of the farm. Estimates of labor requirements were lower for the pasture system but can vary from farm to farm. These factors must be considered in any economic analysis or for dairy producers considering alternative approaches.

Observations from the teaching herd at NCA&T State University have shown an estimated reduction in feed costs by at least 25% from 1995 before the grazing management program was initiated. They also report 50-60 % less time scraping and handling manure because cows are on the pasture much more of the time. Body condition of cows has remained acceptable and overall health problems have been low. However, milk production and reproduction in the herd were less than optimal and alfalfa-based pastures deteriorated over time.

When all factors are considered, pasture-based systems appear to be economically feasible for some producers as an alternative dairy production system for the Southeast. Pasture-based dairy systems can enhance local communities in several ways including economic stability, green space, and a pleasant rural environment compatible with nearby residential areas.

Outreach efforts include several field days and grazing schools for dairy producers, extension agents, and NRCS employees. Poster presentations have been at several events and a paper was presented at Tufts University in 1995. This project has been a focal point for several tours and some dairy producers have increased use of pasture in their management systems.

Clifton King
NewZealand

SARE grant **$180,497**

SARE
Sustainable Agriculture Research and Education
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Wildlife Enhancement and Education as a Catalyst in the Widespread Implementation of Sustainable Agricultural Practices

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SARE grant $173,205

This project explored the feasibility of incorporating critically needed wildlife habitat on a landscape scale, with water quality benefits, into production agriculture in eastern North Carolina and Virginia. A team composed of producers, landowners, natural resource agency professionals, wildlife enthusiasts, and university-based researchers was assembled. This Farm Wildlife Recovery Team established four sets of experimental farm units in three agronomic regions in eastern North Carolina and central Virginia.

Each set included two farms with field borders of early-successional vegetation at the edge of every tilled field, and two farms where predators were removed. Utilizing a 2x2 factorial model, we established one control farm that had neither habitat enhancement nor predator management, one farm with both treatments, one farm with habitat enhancement, and the remaining farm with predator management. Each farm unit was 300 to 500 acres in size, allowing researchers to analyze landscape scale responses by wildlife to treatments. We measured water quality on two additional farms in the coastal plain of North Carolina. We used mailed surveys to estimate economic benefits of increasing wild quail populations. A combination of traditional weigh wagon technology and high tech precision farming systems was used to estimate opportunity costs of establishing field border systems. Insects were sampled with sweep nets, pitfall traps, and sticky traps. Crop damage by insects was assessed by direct observation of fruits. Wildlife was censused by flushing birds on transect lines in the winter, counting singing males in springtime, searching for nests, and listening for quail coveys to call at dawn in the fall. The project funds were supplemented greatly by companion contracts and grants to assess water quality, impacts of predation on farm wildlife populations, and Integrated Pest Management implications. One consequence of the multiple funding sources for the project was that some of the scientific measurements (water quality, insects) were still being analyzed at the time of this final report, and for the predation aspect, the work is slated to go on for an additional two years. The Farm Wildlife Recovery Team will continue to carry on the work established through this project way beyond the 1998 completion date.

What have we learned? Will wildlife enhancement and education be a catalyst for the widespread implementation of sustainable agricultural practices? The strong interest in bobwhite quail and other farm wildlife made assembling the Farm Wildlife Recovery Team a pleasure. Many more landowners and producers volunteered their land for inclusion into the landscape-scale experiment than could be incorporated. Also positive was the eagerness of the Natural Resource Conservation Service to incorporate the field border systems we worked on as a model for receiving incentive payments for soil and water conservation practices under the 1996 Farm Bill. Quail, sparrows in the winter time, and field sparrows in the summer were significantly more abundant on farms with field border systems, while predator management has yet to have a demonstrated influence on farmland bird populations. Some species of birds did not appear to respond to field border systems. There are two more years to go on the predator management work, so this is a tentative and preliminary observation. Although the water quality data is currently undergoing final statistical analysis, it appears that field borders established on mineral soils that are not dominated by sand layers may result in a reduction of nitrates leaving the field in ground water.

Field borders established on organic (black) soils did not influence ground water quality. We learned that field borders apparently do not reduce yields of grain crops in adjacent fields, and, further, that edges of fields often produced at below or near breakeven levels of profitability.

Preliminary results of our IPM insect work indicate that field borders may harbor beneficial insect populations that could actually protect cotton crops from pest infestations and increase yields. The Weed Sweep technology we developed and tested promises to save producers 50% over traditional bushhogging or mowing of field edges. Our economic assessment of the value of $63 per covey found by quail hunters suggests that landowners could

pay for field border establishment and maintenance by a combination of recreational income and government incentive programs for water quality.

Our educational outreach programs have reached national, regional, statewide and local audiences numbering well over 1 million people. Awareness, however, is a far cry from implementation of practices that will result in desired wildlife increases on farms. Our qualitative assessment of landowner and land manager attitudes indicated that many influential people prefer the "clean farm". These folks are not aware that the sharp borders between woods and fields and other trademarks of conventional agriculture may be reasons why farm wildlife, including the quail they enjoyed in years past, declined. Rather than develop a simplified computer decision aid and publication package to encourage landowners and managers to adopt field borders, we have reconsidered our public outreach efforts. The North Carolina Cooperative Extension Service will produce a video in 1999 introducing the many interesting things this project is doing, with the objective being to get the landowner to ask a natural resource professional for assistance in integrating wildlife into production agriculture.

Extension publications presenting our findings will be prepared over the next two years, when our field data from all the years has been assessed. Natural resource professionals in North Carolina will be provided specialized training opportunities, these video tapes and publications and, of course, they will be made members of the Farm Wildlife Recovery Team, just as all cooperating landowners. Far from a one-shot effort that dies when the funding is spent, this project has developed into a sustaining program. The challenge of reversing the decline of desirable wildlife on our farms will continue, but we are moving in constructive ways to bring research information and concerned people together to reverse the declines.

SARE
Sustainable Agriculture Research and Education
Southern Region

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Pasture-Based Swine Production Systems for Limited-Resource Farms in the Mississippi Delta

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SARE grant $274, 412

Agriculture in the Mississippi Delta of Arkansas is dominated by traditional row crops such as cotton, rice, and soybeans that are produced on large-scale farms. Therefore, this demonstration-education project was designed to provide technical-assistance to aid limited-resource farmers interested in adopting a pasture-based swine management (PBSM) system. Pasture-based systems or outdoor systems, offer a relatively low-cost alternative to conventional systems, therefore, are appropriate for limited-resource farmers in the Delta.

Objectives:

1) Design and develop an effective training system for pasture-based swine production.

2) Provide training and technical assistance to limited-resource farmers to increase the adoption rate of pasture-based swine production in the Mississippi Delta region.

3) assess the market potential for pasture-raised pork in the Mississippi Delta of Arkansas.

4) identify perception and acceptance of pasture-raised pork among consumers in the Mississippi Delta region of Arkansas.

5) assess the economic and social impact of pasture-based swine production in the Mississippi Delta region.

Approach

In the first year, the major focus of the project was the establishment of a community-based demonstration site where farmers could visit to learn how to set up and operate PBSM systems. This site was constructed on land operated by the Arkansas Land and Farm Development Corporation in September 1996. Throughout the project, presentations at ALFDC conferences, field days, and tours of the ALFDC demonstration site have provided technical information for farmers and increased the community awareness of low-cost, sustainable methods of producing pork.

To increase the scope of the community-based training and demonstration program, two private farmers in 1997 and four in 1998 were selected to serve as farmer-trainers to assist in the training of other farmers in their communities interested in PBSM systems. The University of Arkansas at Pine Bluff was also selected in 1998 to build a PBSM demonstration site to serve farmers in the southern region of Arkansas.

Paraprofessional Training: Technical support staff evaluated farm sites and developed pasture layout plan for each farmer. Several informal workshops were conducted at the ALFDC demonstration site to provide farmers with hands-on experience in constructing farrowing huts with electrical fencing and pastures. Because each of these farms are small-scale based on industry standards, a specific management plan was provided to encourage cooperation among farmers and uniformity in management. Farmers were visited frequently to provide assistance and assess their development progress in the PBSM systems. Periodically, meetings of the farmer-trainers were held at the ALFDC so they could discuss among themselves problems and strategies for solving individual problems.

Market research was conducted during 1998 by Arkansas State University to determine consumer perception and preferences for pasture-raised pork. A mail questionnaire was designed and sent to a sample population that was randomly selected from 1,200 consumers, 42 supermarkets and restaurants located in 12 agricultural districts in the Delta region of Arkansas and the cities of Little Rock and Memphis, TN.

Using the USDA Forest Service computer-based IMPLAN (Impact Modeling and Planning) system that is capable of estimating regional and county level data on inter-firm and industry economic impact, the market survey estimated the direct, indirect, and induced effects of pasture-raised pork operations and value-added activities of a prospective limited-resource farmer on the economy of the Delta area of Arkansas. Data used for the analysis was based on projected pork production and value-added activities of a single farmer and 1997 industrial relationship data of twelve a districts selected from the Delta area of Arkansas.

Results

The ALFDC demonstration site has been a valuable resource not only to train farmers but to demonstrate that a PBSM system can

Results

The ALFDC demonstration site has been a valuable resource not only to train farmers but to demonstrate that a PBSM system can be constructed and operated using resources available in the Delta. Furthermore, the ALFDC demonstration site has allowed the technical support group to acquire management techniques and information that can be passed on to farmers thus preventing them from making costly mistakes.

Six farmers were selected to establish PBSM systems and to serve as farmer-trainers. In addition, another demonstration site was developed at the University of Arkansas at Pine Bluff The establishment of these farms has increased the scope of the community-based training program and awareness of how to produce pork using low-cost, sustainable methods. Production data generated from all farms will be summarized and used in developing educational materials for limited-resource farmers.

Market survey results. The results of this survey indicated the existence of a market niche for pasture-raised pork products among urban consumers. About 39% of the consumers in rural agricultural districts in Arkansas and almost 70% of urban consumers who responded to the survey showed preference for "environmentally friendly" pork products over conventional ones. Over 73% of the surveyed population identified pasture-raised pork as natural and healthy. Sixty-five percent of retailers surveyed preferred to sell locally and organically grown meat products if available at premium prices.

The IMPLAN analysis estimated the total output produced by other sectors in the Delta to support a small-scale (producing 240 market hogs annually) pasture-raised pork operation. Results indicated that for each dollar of output directly produced by a swine farmer, there will be $2.17 of further output and activities created, and for each person directly employed within the sector there will be 2.45 people employed in the Delta economy through indirect and induced effects.

Impact of Results

Technical assistance and training programs. Funding for this project has helped fill a technical assistance gap in the Delta by providing technical information and assistance to limited-resource farmers interested in PBSM systems. Furthermore, limited-resource farmers now have the means of obtaining information about PBSM not only from the ALFDC and ASU, but from fellow farmers that were involved in this project. The cooperative efforts of the ALFDC, ASU, UAPB, and farmer-trainers have allowed the development of a community-based technical assistance program. Furthermore, farmer-to-farmer networking that is developing will enable farmers to become less dependent on the technical staff for advice and problem solving.

Market survey and cost-benefit analysis. This market survey did not provide cost-benefit analysis information to help prospective farmers determine the minimum number of hogs, acreage, methods, and inputs needed to viably evaluate the potential of the alternative pasture-raised pork production practices. However, it has provided the baseline information about consumers concerns, preferences and extent of market that exists for these products in the Delta area. The research has also provided the market window analysis for prospective limited-resource farmers to evaluate potential profitability and important market information and risk assessment necessary for them to confidently consider expanding or diversifying beyond the demonstration level and further incorporating a transition to sustainable practices into their farm operations.

More important than the increase in farm income and employment is the increased economic activity in rural economies of the Delta area that would support services and improve the quality of life available to farm and non-farm families. The pasture-raised pork operations would require services from direct supporting industries such as utilities, transportation, packing, production equipment, etc. A relatively high proportion of production cost would go to labor and local resources, generating a significant demand for consumer goods and services in the Delta region. Furthermore, increased profitability of production and marketing, combined with support and secondary activities, would generate a rural equity and tax base to support education and local government services.

SARE
Sustainable Agriculture Research and Education
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Using Farm Family Case Studies to Teach Sustainable Agriculture

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Case study farm families
Cooperators continued on next page

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Without effective methods to educate producers about advancements in sustainable agriculture production, the development of new techniques would have academic, but very little practical value. The goal is widespread adoption of proven sustainable technologies on farms worldwide. The challenge is to be as effectual with our educational outreach as we are productive in research and development.

The purpose of this project is to use a creative multi-media approach to extend the experiences and results of an on-farm sustainable farming demonstration project and to encourage widespread support and adoption of sustainable agriculture practices. Educational videos and written materials featuring a variety of farm types in Kentucky, Mississippi, and Tennessee are being developed to educate producers, community leaders, and school children throughout the United States about the value of sustainable agriculture and the challenges and benefits in applying sustainable technologies to the farm.

Objectives

1.) Develop case studies of farm families that have employed sustainable agricultural production practices on their farms. Prepare for a farm audience a five-part video series that documents the successes and challenges of these families in adopting sustainable agriculture practices and the economic and environmental impacts that resulted.

2.) Prepare a facilitator's guide to accompany the case study videos that includes lesson plans, discussion questions, farm overviews, fact sheets, and worksheets that provide more detail on the concepts in sustainable agriculture that are introduced in the farm family case study videos .

3.) Prepare for a non-farm audience a 15-minute video that emphasizes the potential benefits of sustainable agriculture for the community and encourages community leaders to support the adoption of sustainable agriculture techniques on local farms.

4.) Develop up to five condensed versions of the case farm videos for public school teachers to pilot-test in their classrooms and to complement the Ag in the Classroom curriculum. Construct lesson plans to accompany the video(s) and facilitate its use by teachers.

5.) Distribute one copy of all materials to each 1862 and 1890 land grant University.

6.) Present the concepts of sustainable agriculture to 500 farmers in Kentucky, Mississippi, and Tennessee by conducting 25 educational meetings and presentations. Educate 300 Extension agents and other agriculture professionals about sustainable agriculture through in-service training.

Approach

A predecessor of this project was a five-year whole-farm demonstration project called Agri-21 Farming Systems (Agri-21). Agri-21 was designed to help farmers move towards a more sustainable operation. Following an intensive evaluation of selected farms, cooperating Agri-21 producers and project participants developed whole-farm plans detailing an approach to more profitable, environmentally friendly operations. Various sustainable technologies have since been adopted on the participating farms. Throughout the Agri-21 program, comprehensive sets of economic and environmental data were gathered and analyzed. These data were used in the development of the case studies video project.

The five farm-family case studies developed for this project highlight sustainable agriculture techniques adopted on selected Agri-21 farms. In total, ten different themes are featured. The majority of information in the videos is presented by the case study families. Each family discusses and/or demonstrates how the adoption of sustainable techniques helped them meet their goals pertaining to farm profitability, environmental concerns, farm leadership in local communities, and farm family quality of life.

A written facilitator's guide accompanies the videos. The guide, which will be used primarily by agricultural extension educators, provides an overview of the case study videos, suggests methods in which the videos can be used to achieve a set of educational objectives, provides suggestions for stimulating group discussions, and includes fact sheets and worksheets which provide more detailed information on the topics introduced in the videos. The written materials include enough information that educators will need little or no training prior to adopting the materials for educational seminars.

Draft versions of video and written mate-

rials were reviewed by the project steering committee, participating farm families, and a panel of over 40 reviewers of various disciplines. The reviewers provided feedback on the quality of the material presented and the value and appropriateness of the information presented. The feedback directed final revisions of the materials.

The case study materials will be used by the three states cooperating in the project to present concepts of sustainable agriculture to at least 500 individuals over a two-year period. In addition, a copy of the completed materials were distributed nation-wide to each 1862 and 1890 land grant university.

The footage obtained from the five case study videos was used to create a sixth video for a non-farm audience. The footage was re-cut and supplemented with b-roll from various sources. This video will be shown to community leaders in an effort to foster a greater awareness of the benefits of sustainable agriculture and encourage increased adoption rates of sustainable agriculture on local farms.

A youth project steering committee was appointed to develop a shorter version of the materials for use in teaching youth. The steering committee included teachers, Extension youth educators, and communications specialists. The steering committee guided the adaption of the case study videos for use with youth audiences.

Measurements

An evaluation form was distributed to audience members after workshops in which the case study videos were pilot-tested. The evaluation tested the quality and educational value of the materials. In addition, a similar evaluation was distributed with the youth materials.

Results

The five case study videos, the video targeted for general audiences, and the youth video are complete. Each of the seven videos is approximately 15-minutes in length, documentary-style, and contains all the elements of a standard long-form educational video including testimonials, professional narration, field footage, stock footage from multiple sources, titles, graphics, composites, illustrations, animation, supers, multiple music tracks, and credits.

One video was pilot-tested during five Integrated Marketing and Management In-Service agent training seminars conducted in Tennessee from September to November, 1997. Written and verbal evaluations were consistently favorable. In addition, an Extension Agent In-Service training in Kentucky was conducted in March, 1998 to train Kentucky agents how to use the videos and educational materials.

All written materials, including the case study facilitator's guide, youth video curriculum guide, and marketing brochures, are complete. The teaching guides were reviewed by the steering committee, participating farm families, and a panel of reviewers.

The case study videos and the "general audience" video have been distributed to every county in Tennessee, Kentucky, and Mississippi and to each 1862 and 1890 land grant University. Seventy-five copies of the youth video and curriculum guide have been distributed to teachers at the Tennessee Farm Bureau Federation University Workshops.

Impact of Results

The major impact expected from the completion of this project is increased awareness, support, and adoption rates of sustainable agriculture production by both farm and non-farm audiences, including producers, extension agents and specialists, policy makers, teachers, and school children.

Potential Contribution

Producers who watch this video will benefit from the lessons learned by others who have employed sustainable agriculture practices on their farms. As a result, producers will make more informed decisions when adopting sustainable technologies on their own farms. More informed decisions could potentially yield increased farm profitability, decreased negative environmental impacts on and off the farm, greater efficiency in farm management, an edge in competitiveness, and an enriched quality of life for the farm family.

Consumers, in turn, will benefit by farmers' increased adoption of sustainable technologies. The food and fiber supply will continue to be safe, reliable, affordable, and fresh. Consumers will continue to enjoy clean air and water, a more stable economy that includes turnover of farm resources, enhanced quality of life, and better health. The community will also continue to benefit from farm family involvement and leadership in community activities.

Students who are exposed to the video and participate in classroom activities designed to augment the lessons learned in the video will gain a greater appreciation of where food originates and what it takes to get food from the farm to the store. In addition, as more students are exposed to the many challenging and diverse careers in agriculture, more students will participate in farm and off-farm careers in agriculture.

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Sustainable Agriculture Research and Education
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Managing Soil Phosphorus Accumulation from Poultry Litter Application Through Vegetable/Legume Rotations

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Applying poultry litter at rates sufficient to meet crop needs for N results in P accumulation that can lead to non-point source pollution of surface waters. Legumes are able to use significant amounts of P and K. An advantage of using legumes for removing excess P is that no additional N fertilizer has to be applied since legumes can obtain N from the atmosphere through N_2 fixation. Including warm- and cool-season legumes for hay or silage may be one way to reduce excess soil P.

Objectives

1.) Investigate the use of warm- and cool-season legumes and legume-grass mixes in rotational cropping systems to remove excess P supplied by poultry litter;

2.) Evaluate cool-season legumes for P uptake efficiency following litter application rates on spring vegetables

3.) Monitor P, and K accumulation, N leaching, and P runoff in a vegetable-forage legume rotation system

4.) Demonstrate use of annual legumes in cropping systems, utilizing poultry litter as a nutrient source, on grower-owned land under grower conditions.

Approach

Litter rates for all objectives were based on soil test nitrogen (N) requirement of the vegetable crop and percent N content of the litter. Litter was applied to the vegetable crop only. Treatments were incorporated immediately after application by power tilling.

Cumulative 1X litter rates over the study period were: obj. 1.) spring-11.3 tons/ac, fall-5.9 tons/ac; obj. 2.) 13.6 tons/ac; obj. 3.) spring-6.8 tons/ac, fall-5.9 tons/ac: obj. 4.) 4.0 tons/ac.

In objective 1 (Texas) the vegetable crops were: watermelons - spring 1995; broccoli - fall 1995; tomato - spring 1996; collards - fall 1996; squash - spring 1997; turnips - fall 1997. The spring legume crop was 'Iron and Clay' cowpeas and the fall crop was crimson clover. In Oklahoma the vegetable crops were: fall - broccoli, turnip, spinach: spring - sweet corn, muskmelon. The fall cover crop was hairy vetch and the spring crop was southern cowpea.

Dry matter yields of Iron and Clay cowpeas and crimson clover were not significantly affected by fertilizer treatment during the three year study period (1995-97).

Mean percent P increased over time for both legumes as rate increased (Iron and Clay cowpeas: control - .34%, 1X - .44%, 2X - .47%, 4X - .52%, commercial blend - .40%; crimson clover: control - .34%, 1X - .42%, 2X - .49%, 4X - .62%, commercial blend - .43%). Pounds per acre of P removed by both legumes also increased as rate increased (Iron and Clay cowpeas: control - 7.0 lbs, 1X - 9.0 lbs, 2X - 9.3 lbs, 4X - 11.4 lbs, commercial blend - 8.0 lbs. Crimson clover: control - 7.7 lbs, 1X-12.9 lbs, 2X - 13.2 lbs, 4X - 16.5 lbs, commercial blend - 11.3 lbs).

Average P accumulation in the 0-6 in. soil level over six seasons was less at the 1X (57 ppm) level of application than the 2X (112 ppm) and 4X (195 ppm). Phosphorus levels for the commercial blend (23 ppm) were equal to the control (21 ppm).

Utilizing a cropping system approach to reduce soil P accumulation proved to be effective. Mean data indicated that a system of spring vegetable-fall legume reduced P concentrations in the surface 0-6 in. of soil significantly to 48 ppm. Greater concentrations were found with systems of fall legume-spring vegetable (90 ppm) and spring vegetable- fall vegetable (96 ppm).

In Oklahoma under a cool-season vegetable rotation, cowpeas effectively lowered soil N levels but not soil P levels. In a warm-season vegetable rotation, hairy vetch appeared to raise soil N levels, but showed some evidence of controlling soil P levels. There was no buildup of soil P after two litter applications, even at the 2X rate.

In objective 2 the crops were: watermelon - 1995; sweet corn - 1996; tomato - 1997. In fall 1995, cool-season legumes consisting of crimson clover, berseem clover, hairy vetch, and red clover were seeded. Due to loss of stand of berseem clover because of freezing weather, a crimson clover-ryegrass mix was substituted in 1996.

Poultry litter rate showed no significant effect on mean dry matter yield of the four legumes. There was a significant effect by legume species

on mean dry matter yield over time. Crimson clover-ryegrass mix produced 3,066 lbs/acre followed by hairy vetch with 2,012 lbs/acre. Crimson clover produced 1,361 lbs/acre and red clover 832 lbs/acre.

Mean plant P concentration in the 0-6 in soil depth increased as litter rate increased (control - .49%, 1X - .54%, 2X - .60%, 4X - .70%, commercial blend - .50%). Phosphorus uptake also increased as rate increased (control - 5.8 lbs/ac, 1X - 7.4 lbs/ac, 2X - 7.9 lbs/ac, 4X - 11.4 lbs/ac, commercial blend - 6.8 lbs/ac). Hairy vetch contained a mean percent plant P of .63% followed by crimson clover (.57%), crimson clover-ryegrass (.54%) and red clover (.48%). Phosphorus removal was greatest with a crimson clover-ryegrass mix (12.9 lbs/ac) followed by hairy vetch (10.2 lbs/ac), crimson clover (7.8 lbs/ac) and red clover (4.2 lbs/ac). Mean concentration of P in the 0-6 in. soil depth was reduced over time by hairy vetch to 77 ppm, followed by crimson clover (87 ppm), crimson clover-ryegrass (95 ppm) and red clover (103 ppm).

In objective 3 the vegetable crops were: turnip - fall 1995; sweet corn - spring 1996; turnip - fall 1996; watermelon - spring 1997. The cover crops were crimson clover and Iron and Clay cowpeas.

Due to a lengthy dry spell, there was not enough precipitation to collect runoff in either fall 1995 or spring 1996. In fall 1996 two major rainfall events occurred. Concentrations of P in the runoff were very low (< 0.8 ppm). No differences were found regardless of poultry litter rate or cropping system. This could be attributed to soil incorporation of the treatments.

Mean P accumulation in the 0-6 in. soil depth increased from 70 ppm to 185 ppm when litter rate was increased from 1X to 4X. Phosphorus levels from the commercial blend remained close to that of the control (17.5 ppm and 27.0 ppm respectively).

The least amount of residual P in the surface 0-6 in. soil depth was from a system of spring vegetable-fall legume (57 ppm) followed by spring vegetable-fall fallow (76 ppm) and spring legume-fall vegetable (92 ppm).

Objective 4 was implemented in spring 1996 with the establishment of two demonstration plots. Litter at the rate of 4 tons/ac was applied. Tomato plants grown on plots with litter produced an average of 28 lbs of fruit per plant. Yield was not obtained for sweet corn but was reported that more ears were harvested from the poultry litter plots than the commercial fertilizer plots. The plot area that received litter produced 1,356 lbs/ac more vetch than that receiving commercial fertilizer.

Results

Results have identified strategies that reduce non-point source pollution and soil imbalances and offer an opportunity for adoption of improved, environmentally sound management practices. Due to demonstrations of litter use in vegetable production programs, grower interest and awareness of the nutrient value of poultry litter has been increased.

Continued demonstrations will help show growers how a cropping system approach can be used to alleviate problems associated with litter use, especially P accumulation. Also, through outreach programs, we will continue to educate growers on nutrient management strategies through environmentally sound best management practices.

Contributions

Benefits to sustainable agriculture derived from this study include: 1.) Identifying new vegetable farming systems that are productive; 2.) Identification of strategies which reduce non-point source pollution and soil nutrient imbalances; 3.) Offer an opportunity for vegetable and other crop producers to adopt improved, environmentally sound management practices that do not sacrifice profitability; and 4.) Increase the data base that can be used by regulatory agencies to enact policies that are environmentally and producer friendly. These practices will help to conserve natural resources as well as condition, maintain, and conserve our most important natural resources, soil and water. Poultry litter's value as a fertilizer will be enhanced instead of becoming an increasing environmental problem.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS95-70
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Effects of Organic and Chemical Fertility Inputs on Soil Quality in Limited-Resource Vegetable Farms

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SARE grant $184,319

Biological vegetable farmers produce high value crops whose continued success is dependent on enhancing the quality of their soil. The objective of this project was to study the effects of conventional and alternative fertility practices on biological, chemical, and physical attributes of soil quality and crop yield on six limited resource vegetable farms in Virginia and Maryland and at two experiment stations in North Carolina.

Objectives

1.) Assess the effects of organic and inorganic soil amendments on selected soil biological, chemical, and physical properties indicative of soil quality on limited resource vegetable farms in the mid-Atlantic region.

2.)Teach vegetable farmers to perform simple on-farm tests to determine the effects of their production practices on soil quality.

3.) Develop fact sheets for distribution to farmers on:

a.) Effects of organic and inorganic fertility on soil quality, and

b.) Sampling and monitoring soils for indicators of quality.

4.) Conduct field days for farmers, extension agents and educators, agricultural consultants, and researchers to share the results of the field studies and the methods that farmers can use to monitor soil quality.

5.) Present the results of the effects of organic and inorganic fertility on soil quality and a practical guide to monitoring soil quality at the Virginia Sustainable Agriculture and the Carolina Farm Stewardship Association conferences.

6.) Write research articles on the effects of organic and inorganic fertility on soil quality.

Approach

Farms produced sweet corn (*Zea mays* L.) or melon (cucurbitaceae) during 1996 and tomato (*Lycopersicon esculentum* L.) during the 1997. Three of the farmers were long term organic farmers and three employed conventional chemical practices. Two fertility treatments, a conventional treatment using commercial fertilizer and an alternative treatment using compost, were employed. The conventional fertilizer was a mix of ammonium nitrate, triple superphosphate, and muriate of potash designed to meet the soil test recommendations for N, P, and K for each farmer's specific crop and pre-existing soil test level. The alternative soil amendments, composted cotton gin trash and composted hay and manure or yard waste and manure, were applied at rates to meet or supplement the nitrogen needs of each crop according to estimated N mineralization rates. Individual experimental plots measured 25 feet by 25 feet, and treatments were replicated three times in a randomized complete block.

Fertility sources were applied onto plowed and disced or roto-tilled soils in the spring and immediately cultivated into the soil. Melons (muskmelon or watermelon) and tomato ('Celebrity' or 'Mountain Spring') seedlings were transplanted and sweet corn ('Silver Queen') was drilled within three weeks of soil fertilization and amendment addition. Soil was sampled twice from each plot each year. Samples were collected at sweet corn height of 12 inches and at melon and tomato early fruit set to a depth of 6 inches for: Mehlich I-extractable P, K, Ca, Mg, Mn, and Zn; pH; total Kjeldahl N; NH_4-N; NO_3-N; total C; organic matter; cation exchange capacity; and total P; and to a depth of 12 inches for biological indicators. Immediately following harvest, soil was sampled in the same manner for Mehlich I-extractable nutrients, pH, bulk density, plant available water-holding capacity, and the biological indicators. Fresh yield was determined by collecting and weighing ripened, marketable sweet corn ears, melons and tomato fruit from a 12-foot section of the center row from each plot during three week periods.

This experiment station research was conducted at the Horticultural Crops Research Station in Clinton and the Center for Environmental Farming Systems (CEFS) in Goldsboro. The experimental design was a split plot with either tillage or surface mulch (wheat straw) as main plots, and soil amendments including either synthetic fertilizer, composted cotton gin trash, swine manure, or a rye/vetch cover crop as subplots. Each experimental unit consisted of six 25-ft rows. Soil were limed to a pH of 6.2 and a rye/vetch cover crop was planted in the fall of 1995 and 1996. In the spring of 1996 and 1997, soils were amended with synthetic fertilizer, compost, swine manure, or the rye/vetch cover crop. To-

matoes ('Rio Colorado') were planted 14 days after soil amending. Soil samples were collected two weeks after planting and at harvest in a uniform pattern, placed in coolers with ice and returned to cold storage on the same day. All soil dilutions and extractions were done within two weeks of soil sampling.

Soil samples were analyzed for microbial population densities using serial soil dilutions and eight different media. Total numbers of culturable bacteria, total fungi, thermophilic microorganisms, fluorescent pseudomonads, *Trichoderma* and *Gliocladium* species, *Fusarium* species, *Phytophthora* and *Pythium* species, and sclerotia of *S. rolfsii* were quantified. The incidence of southern blight was recorded in each experimental plot, beginning 40 days after transplanting until harvest. Tomatoes were harvested and yields were taken at 72 days after transplanting.

Results

Many important conclusions were drawn from the combined on-farm and experiment station data. The alternative fertility treatment increased soil concentrations of most nutrients above that of the commercial fertilizer because the alternative amendments were a rich source of most essential nutrients, but only N, P, K, and, sometimes, limestone was recommended for the conventional treatment. The organic amendments improved several soil physical and chemical properties that normally require longer periods for positive change. Within only two years of the start of the study, the application of compost increased soil organic matter, total C, and cation exchange capacity above those of the fertilized soils. Bulk density was significantly reduced in the compost-amended plots compared to the fertilizer treatment. However, crop yields were not significantly increased by the alternative treatments on the farms or at the experiment station despite the improvement in many soil physical and chemical properties. Incorrectly estimating plant available N may have reduced the yields obtained with the alternative fertility treatments, and presents the major nutritional challenge to organic production.

The addition of compost to soils with a history of conventional production increased the baseline populations of several important groups of microorganisms, including *Trichoderma* and *Gliocladium* spp, and thermophilic organisms. Fields with a history of organic production have higher baseline populations of microorganisms and a greater capacity for population growth. Populations of microorganisms in fields with a history of organic production (especially populations of *Trichoderma* and *Gliocladium* spp and total bacterial populations) were initially higher than in fields under conventional production practices. Populations of thermophilic microorganisms and *Trichoderma* and *Gliocladium* spp in historically inorganic fields can be brought up to levels comparable to organically-managed fields within a short period of time. These results are significant because these fungal species are known antagonists of pathogenic soilborne fungi and are known biological control organisms.

Tillage and mulching were important factors affecting plant pathogens and yields. Yields were highest in surface mulched plots with synthetic fertilizers, cotton gin trash, or swine manure. Disease incidence at the experiment station site was 67% in tilled plots amended with synthetic fertilizers, whereas disease incidence was 3%, 12%, and 16% in surface mulched plots amended with cotton gin trash, swine manure, or rye-vetch, respectively. Organic soil amendments were suppressive to disease and enhanced beneficial soil organisms.

Research has shown that three to five years are normally required to observe any benefit from organic amendments, usually in the form of yield increases. Our research demonstrates increases in populations of thermophilic microorganisms and *Trichoderma* and *Gliocladium* spp over the span of a growing season and enhancement in several important soil chemical and physical properties within two seasons. If these changes correspond to an increase in future yields, then information on the abundance of the beneficial microorganisms and key soil chemical and physical attributes should be important as part of a soil quality indicator package.

SARE
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Agronomic and Economic Benefits of Intercropping Bean with Banana

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SARE grant $99,845

Objectives

1. Determine the effects of planting time and frequency of bean on yield and quality of banana

2. Determine additional benefits of intercropping as contribution to nitrogen fertility, weed control, and soil conservation provided by intercropped bean.

3. Determine the economic feasibility of the best planting time and frequency of bean/banana intercropping on a semi-commercial scale.

The project was aimed at determining the agronomic and economic benefits of intercropping bean with banana in Puerto Rico. For achieving the first objective, we intercropped two bean cultivars, either once or twice with a banana cultivar, in the first field experiment to determine the best timing and frequency of this intercropping.

The November planting of banana, together with two consecutive cycles of bean intercroppings proved to be the best timing and frequency of the intercropping. Banana yields were not significantly affected by either one cycle or two cycles of bean intercropping.

For achieving the second objective, we collected soil and banana leaf tissue samples from the first field experiment and analyzed for nitrogen content under laboratory conditions to determine the contribution of bean plants to nitrogen fertility of the soil and to the intercropped banana plants.

Soil analysis data indicated that the contribution of bean plants to total nitrogen, ammonium nitrogen and nitrate nitrogen contents in soil was minimal. Plant tissue analysis data indicated that there was no significant difference in total nitrogen content between the intercropped banana plants and the banana monoculture plants.

The contribution of bean plants to weed control was also determined from the same field experiment. The weed count in the bean-intercropped plots was significantly lower in bean-intercropped plots than in non-bean intercropped plots during the November and January plantings, but in March and May plantings there was no such difference. The plant cover factors of bean and banana plants were collected from the first field experiment for calculating the soil loss under bean-intercropped and banana monoculture conditions. There was a greater amount of soil loss detected in the bean-intercropped plots than in the banana monoculture plots.

To achieve objective 3 on the economic benefits of adopting bean/banana intercropping practice, we conducted a second field experiment next to the first field experiment. Eonomic analysis data indicated that two cycles of bean intercropping produced a combined net income of $4,319.12/ha. This sum is $3,008.17/ha more than the net income of $ 1,310.95/ha from banana monoculture.

Impact and Contribution

The result of our first banana-bean intercropping experiment indicated that the most productive intercropping treatment was the November planting of banana together with two consecutive intercroppings of bean cultivar Arroyo Loro. By adopting this November planting of banana with two intercroppings of bean, banana farmers living in the mountain region of Puertto Ricco would be earning an additional income of $ 3,008.17/ha as obtained from our second field experiment. In addition, banana yields were not significantly affected by intercropping of bean, irrespective of different dates of their planting.

All these favorable results should promote the practice of bean-banana intercropping in Puerto Rico. The inclusion of soil conservation practices (no tillage and contour planting) in our field experiments will serve as a model for banana farmers to achieve sustainable production of this commodity.

Furthermore, during the course of conducting our field experiments, we observed that a number of banana plants with heavy fruit bunches were toppled. In order to prevent the fruit bunches from falling to the soil, we have developed a fruit supporting device made of PVC pipe (1.5 m long x 5.1 cm in diameter) coupled with a piece of y-shaped tree branch. This practice proved to be highly effective and cheap, and should be adopted by the banana farmers in the mountain regions of Puerto Rico.

We are disappointed in the finding that a positive contribution of the intercropped bean to nitrogen fertility in soil or to the banana

plants did not materialize. The bean seeds we used were treated with nitragin inoculum and developed normal nodulation on roots. However, the probability of reducing the use of chemical fertilizer through the aid of nitrogen fixation of the bean plants did not succeed in the present research.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS96-73
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Soil Conservation and Pest Management Impacts of Grass Hedges

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SARE grant $137,352

Erosion control effectiveness was evaluated by observing and surveying fields where hedges had been in place for periods up to 7 years. Data from these surveys were compared with surveys made in these fields in previous years to determine changes in land slopes. Rainfall was measured at the experimental fields for use with a computer model to permit extrapolation of observed data to other fields and into the future.

Computer erosion prediction programs including WEPP and RUSLE and tillage translocation models were used to model relative contributions of water erosion/deposition and tillage translocation contributing to the 1-ft steps that surveying has recorded across 5-ft wide grass hedges. Results indicate that tillage contributes as much as 60% to the soil benching in the silty upland areas of Mississippi when slopes exceed 5% steepness. Jingcai Zhu joined the project to develop a computer tool to predict the long-term impacts of tillage translocation and erosion/deposition on cropland farmed with grass hedges.

Insects were monitored with pheromone traps and, later, with sweep nets. Sampling included extensive trapping for boll weevil (*Anthonomous grandis*) and various species of ants and sampling for tarnished plant bug (TPB) (*Lygus lineolaris*) and beneficial natural enemies. Winter temperature regime in hedges was monitored to determine the value of hedges as overwintering habitat for insects. Insect population, crop growth and yield samples were taken in transects oriented perpendicular to the grass hedges. Insect population densities were relatively low in all fields sampled in 1998. As was recorded in 1996 and 1997, very few insects were associated with hedges that were free of broad leaf weeds.

Numbers of tarnished plant bugs increased significantly with appearance of preferred host plants such as pigweed, mare's tail, daisy fleabane or curly doc. In these cases there were minor infestations of tarnished plant bug in hedge weeds (no sample showed more than 4 TPB/24 sweeps). Significantly higher numbers of ants were associated with the hedge and in rows closest to the hedge than in areas of the field not influenced by hedges. Pheromone trap catches indicated that switchgrass did provide adequate habitat for boll weevils to survive winter compared to grass/mixed forb strips located along roadways . Peak emergence from hedges occurred in early April and no subsequent "flush" was observed through the spring and summer. Although better habitat than roadsides, trap catches were extremely low compared to high quality areas such deciduous leaf litter along field edges on Crowley's Ridge.

Rainfall intensity and sediment accumulation above measured at the Brybena Wyatt farm by Alton Johnson. To evaluate the acceptability of grass hedge technology, Bernard Cotton contacted 5 agency representatives in Mississippi and eastern Arkansas. Through informal discussions with these individuals, 10 farmers who wanted to experiment with grass hedges as a system for erosion control were identified. A survey instrument was developed and these participating farmers and agency heads were met to solicit attitudes, opinions, and information on their willingness to use grass hedge technology. This process will continue in early Spring of 1999. One interesting finding is that small acreage vegetable growers are less concerned with the amount of land taken out of production by conservation practices than are large acreage field crop producers because the small grower has more land than he can plant anyway.

Shorter-statured switchgrass accessions collected by Joel Douglas at the Jamie Whitten Plant Materials Center were evaluated compared to mowed and un-mowed hedges of the tall growing 'Alamo' cultivar. Two promising accessions, from Kemper and Chickasaw counties, had stem diameters as large as Alamo (1/4 inch) but grew only to 5 to 6 ft in height (vs 8 ft for Alamo), had canopy spread of only 3.5 to 4 ft wide (compared to 11.5 ft for Alamo), and did not reduce yield of adjacent soybean rows (Alamo did). These erect compact plants allow narrow hedges (narrower than a mowing machine) to be planted. This minimizes land required without sacrificing soil conservation benefits of grass hedges.

Although applied to only a small number of acres, grass hedge technology is gaining national acceptance, in part because of this project. NRCS included this practice, termed Vegetative Barriers, as one of their core buffer strip practices that will be presented in the CORE 4 training scheduled to be implemented in 1999. Seth Dabney wrote the section on Vegetive Barriers in the training materials and conducted the pilot training.

SARE
Sustainable Agriculture Research and Education
Southern Region

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Improving Integrated Resource Management Skills of Beef Producers

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SARE grant $163,642

Objectives

Producers who apply appropriate integrated resource management (IRM) techniques and tools are better equipped to survive in a globally competitive environment. This project will:

1.Identify technological tools supporting IRM by reviewing and developing software.

2.Develop case studies to document producer's selection and application of IRM practices and decision-support tools.

3.Identify IRM research and education needs through forums in which producers (or agricultural advisors) share information and ideas and suggest areas for additional research.

Investigators are capitalizing on ongoing, related efforts through cooperatively planned activities to benefit all beef producers, small and large, with integrated, interdisciplinary programs and materials. This project promotes the development of management skills and improved resource management practices, thus building human capital. Expected outcomes of the project include greater adoption of technological tools, improved on-farm information systems, and greater understanding of IRM concepts with increased feedback to researchers on high priority needs.

Objective 1

Farm operators are being made aware of record-keeping tools for assessing effectiveness and sustainability of management practices. Cow-calf Standardized Performance Analysis (SPA) and Quicken® software is used and demonstrated with individual producers and agricultural professionals, along with other IRM concepts and decision-making tools. Educational programs have included intensive workshops, publications, media, and an IRM Internet home page. Gaps in tools available to support decision-making need are being identified. New software that appears likely to facilitate IRM analysis and decision making is being evaluated and/or developed and added to workshops when appropriate. Educational materials are being modified to reflect lessons learned through field experience and case studies.

Objective 2

Since SPA focuses primarily on animal production and financial performance, it provides insights into costs of production. However, it does not ascertain the nature of underlying problems or indicate the management changes needed. Producers, due to differences in soil resources, managerial expertise, or capital constraints, can have different limiting factors. Interdisciplinary teams are visiting farms, helping participants assemble financial and production data, and discussing potential changes in practices. Details about management structure, goals, enterprise mix, information system components, personal characteristics of farm managers, inventory of farm resources and production levels, and the manager's perception of farm risks are noted. Case study data are being examined to:

1. Provide feedback on performance and potential management adjustments.
2. Find measures of performance common across case studies which are outside known or expected reasonable ranges.
3. Identify production and information practices which could benefit other farms.
4. Note innovative marketing and income diversification alternatives.

Having a team maintain a continuous relationship with managers provides unique insights compared with periodic one-to-one contact with disciplinary specialists. Providing feedback to researchers and educators and sharing ideas for needed research and education is an ongoing activity.

Objective 3

Information exchanges are being conducted periodically. The forums allow producers (or advisors) the opportunity to share ideas and experiences concerning various aspects of integrated resource management. The information exchange focuses on a limited number of topics—for example, marketing alternatives, grazing management, herd health practices—identified in advance. The emphasis is on participants learning from each other and researchers learning from participants. Thus, the forums suggest research and education needs and serve as a basis for future dialogue among beef producers, educators and researchers. Similar formats have been used for an information exchange for producers, veterinarians and accountants.

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Sustainable Agriculture Research and Education
Southern Region

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Crop Management Systems for Improving Production of Culinary Herbs in the Virgin Islands

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SARE grant $143,529

Objectives

a) Develop sustainable soil management practices for culinary herb production using crop rotation with green manures, application of composts, animal manures and other organic fertilizers.

1) Evaluate sustainable weed management methods for culinary herbs using organic mulches, cover crops and biodegradable synthetic mulches.

2) Develop environmentally sound disease and pest management practices for herbs through cultural methods such as intercropping and crop rotation.

3) Increase fertilizer and water use efficiency in herb production by using microirrigation, thereby reducing fertilizer inputs and conserving water, a scarce resource in the Virgin Islands.

Approach

On-station and on-farm trials involving crop rotation with tropical legume green manure crops, and application of organic mulches and fertilizers on important culinary herbs were conducted during the 1998 cropping season. Some of these trials are continuation of previous year's experiments.

The benefits of legume green manure crops (sunnhemp, hyacinth bean and cowpea) grown in rotation with sweet and purple basil, cilantro, sage, parsley and chive was evaluated for the second year at the experiment station. Results in general showed that although there were no significant differences in plant and leaf fresh and dry matter yields, sunnhemp and hyacinth bean grown in rotation with herbs consistently produced higher yields than the cowpea and fallow (control) rotations. For sweet basil and cilantro, sunnhemp and hyacinth bean rotation produced taller plants than cowpea and fallow. Sage was benefitted by sunnhemp in terms of increased plant fresh and dry matter yield. The benefit of three green manure rotations on growth and yield of purple basil, parsley and chive was about the same. However, average yields of culinary herbs grown in rotation with green manure crops are higher than yields from plots with no rotation (fallow). These results are consistent with those obtained from previous year where sunnhemp and hyacinth bean were superior to cowpea and fallow. Without chemical fertilizers these legume green manure crops can increase yield of culinary herbs by 5 to 50%.

On-station trials on the effect of cow manure application on yield of chive and turkey litter- based fertilizer on yield of cilantro were also conducted at the VI Department of Agriculture. Application of cow manure rates of 0, 10, 20 and 40 ton/ha did not result in significant yield increase for chive, however, plant height increased with increasing manure rates. Similarly, cilantro production was not affected by application of turkey litter-based fertilizer at nitrogen rates of 0, 50, 100 and 150 kg/ha.

A farmer cooperator in St. Thomas evaluated various mulch types for his basil production. He compared the effect of black fabric, black plastic, white plastic, wood chips and grass straw on weed growth and fresh yield of sweet basil. A plot without mulch was also established for comparison. Results indicated that all mulches significantly reduced the number and biomass of weeds. The best mulch was the dry grass straw. Basil plot with grass straw mulch produced taller plants and higher total fresh yield than all other mulches except the black fabric.

Similar on-farm trials with mulch types were conducted by a local St. Croix herb grower on parsley and chive. He tested black fabric, silver plastic, white plastic and grass straw. Results for both crops indicated that all mulches reduced the number and biomass of weeds compared with plots without mulch. The grass straw mulch consistently produced higher yields of both fresh and dry parsley and chives. Overall, the results of these studies demonstrate the use of locally available mulching materials as potential for increasing herb production in the Virgin Islands.

For the remaining period of the project, several organic mulches available in the Virgin Islands are being evaluated for their benefits to herb production. Research information from this project will benefit herb growers by reducing their production cost and increasing yield and income. This will translate into lower prices for consumers and high quality fresh herbs free of pesticide residues.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS96-76
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Integration of Pastured Poultry Production into the Farming Systems of Limited Resource Farmers

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SARE grant $149,624

Objectives

The objectives of this three-year project are:

1.) Provide hands-on training in pastured poultry production to twenty-four farm families who are currently members of farmer organizations that are supported by Heifer Project International. Training will include survey information generated on the success, impact and problems that ten other farmers have experienced in pastured poultry production.

2.) Review and summarize federal and state laws regarding on-farm processing of poultry.

3.) Provide training in food safety and legal issues for the same twenty-four families and to assist them in complying with the laws in their state.

4.) Provide training in market development of farm products for the same farmers.

5.) Help these 24 families conduct on-farm practical trials of pastured poultry and its integration with their other farm enterprises.

6.) Include at least eight technical advisors (county extension agents or advisors from other local organizations) in the training program so they are prepared to support and encourage these families and others in the community.

7.) Develop and implement monitoring systems that will provide useful information (income generation, pasture management, farm labor management, quality of life implications, farmer observations and problems) about integrating pastured poultry into a farming system.

8.) Provide follow-up guidance and assistance to the families as they diversify their own production and marketing.

9.) Aid in the development of the American Pastured Poultry Producer's Association (APPPA), which will serve these farmers and others around the country by providing a forum to share information and ideas related to pastured poultry.

Approach

A key component of this project is comprehensive training for farm families and extensionists in all aspects of the pastured poultry enterprise: production, processing and marketing. In 1998 five separate training events were held in Alabama, Kentucky, and Louisiana. One hundred and thirty-eight people participated in these events. Participants built chicken pens, moved the pens, learned about brooding the chicks, butchered chickens, received instruction in food safety and legal issues, learned marketing techniques, and learned how to complete the required record books.

After completing training those farmers who chose to continue in this program were given funds to do a small scale version of pastured poultry on their own farms. With the funds each farmer would build a pen, purchase 100 chicks, a feeder and a waterer. Upon receiving their checks, each farmer also signed a contract to "pass on the gift." Passing on the gift is a Heifer Project tradition in which everyone who receives a gift of animals becomes a donor. In this case each farmer who receives funds to start the poultry project is required to return to Heifer Project the purchase price of the chicks and to train another farmer in their area in the pastured poultry enterprise.

Twelve families chose to join this program in 1998, bringing the total to date to 34. This significantly exceeds our original goal of 24 families.

This year the National Center for Agricultural Law Research and Information (NCALRI) expanded its legal review of federal and state laws concerning on-farm processing and marketing of poultry to include all 13 states in the Southern Region. The first draft of this expanded review should be completed before the end of 1998.

Fort Valley State University in Georgia and Florida A&M University joined this initiative in 1997 and actively demonstrated Pastured Poultry during 1998. Both of these institutions will host Pastured Poultry training workshops in January 1999.

The results to date have been very encouraging. Through the three seasons completed (1996, 1997 and 1998), 34 limited-resource farmers have received training and tried out pastured poultry on their own farms with assistance from this SARE grant. Most have been very pleased with the results of their work and several have expanded their operations or plan to in the future. In most cases, farmers are finding a good market for the chickens and see pastured poultry as a viable component of their farms.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS96-77
Progress Report
December 1998

Sustainable Cropping Systems for Seedless Watermelon and Fall Lettuce in Rotation with Green Manures

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SARE grant $182,751

Objectives

The aim of the project is to develop a sustainable crop rotation system for the production of seedless watermelon following selected cover crops.

Approach

The cover crop treatments were hairy vetch, hairy vetch and rye, crimson clover, crimson clover and rye, and a non-planted control. The cover crops were planted fall 97 at seven locations in North Carolina and Virginia at experiment stations and farmer's fields. The cover crop growth and biomass production were not significantly different in Guilford County whereas crimson clover and crimson clover and rye produced the most biomass in Flecher. In spring 1998, the cover crops were mowed down with a flail mower and left as surface mulch to control weeds and soil erosion, and retain soil moisture. Two seedless watermelon varieties (Abbott & Cobb 5244 and 2532) were transplanted and grown in each cover crop treatment. Abbott & Cobb 500 was the seeded pollinator. The watermelon crop was established well in four sites. The crop stand was poor at two North Carolina sites and one Virginia site due to dry weather. Seedless watermelon yields were satisfactory at the Guilford and Flecher sites in North Carolina. In Guilford, seedless watermelon yields were the highest under hairy vetch and rye (5.0 ton/acre). In Rockingham and Lenoir counties, there was no melon production due to dry weather. In Guilford, the yield of seedless watermelon was not significantly different under the cover crop treatments. The yield response of seeded melons under the cover crops was similar to the seedless melons and the average yield was 4.0 tons/acre. The watermelon yields under cover crop treatments were similar to the fertilizer treatment. At Fletcher, yield factors, for both seedless and seeded melons, were significantly higher for the cover crop treatments than the control. Crimson clover and rye treatment produced the highest yield of seedless watermelon (6.6 tons/acre). The average yield of seeded melon was 11.0 tons/acre under cover crop treatments. The average weight of seedless watermelon under the cover crops was 8.8 lbs and 6.4 lbs under the control. The average weight of seeded melon was 16.8 lbs under the cover crop and lower under control. There was no size difference between the seedless watermelon varieties tested. In Virginia, cover crop growth and biomass yields were satisfactory. Watermelon crop stand and production were good at the Randolph farm and at one of the farmer's sites whereas the crop at the other farmer's site was poor. Hairy vetch and hairy vetch and rye treatments showed higher yields of seedless watermelons. Female flower study was conducted and found the bumblebee as the main pollinator. Pollination of 25% of female flowers was found to be adequate for the production of satisfactory yields of seedless watermelons.

A survey and test marketing of seedless watermelon was conducted to evaluate seedless watermelons from Guilford. Eighty-five percent of the survey participants rated the flavor of seedless watermelon as good to excellent. Ninety-five percent of them showed their preference to buy seedless watermelons even at a slightly higher price than seeded melons. In Virginia, test marketing was conducted at four Ukrop's stores and the consumer perceptions were positive. At Flecher site, a larger taste panel rated the seedless watermelon flavor and crispness as high.

At the Guilford site, nitrate leaching was monitored in watermelon plots during mulch decomposition. The nitrate results showed that decomposition of the cover crop mulch provided enough nitrogen for the melon crop. Pests and diseases were minimized. However, as the cover crop mulch decomposition progressed, weeds became a problem at the middle and late stages of the watermelon growth.

Results

Crop failure due to dry weather and poor germination on some sites resulted in just one year of data collection on seedless watermelon production. In order to have representative data on the sustainable cropping system, participants decided to plant another set of cover crops in fall 1998 and produce another crop of seedless watermelon in 1999.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS96-78
Progress Report
December 1998

Saving the Southern Legacy: Heirloom Plants and Local Knowledge for Profitable, Sustainable Agriculture

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SARE grant $152,817

Southern Seed Legacy (SSL) addresses the urgent need to maintain biological and cultural diversity in American agriculture by saving and increasing the diversity of a plant complex known to southerners as "old timey varieties", "landraces" or "heirlooms". As a grassroots response to the genetic resources effort of the National Plant Germplasm System (NPGS), SLL supports a broad-based collaborative and participatory effort to reverse genetic and knowledge erosion of crops through research and education. By working with gardeners, farmers, grassroots groups, heritage/education garden institutions, and scientists in the Southern Region SLL is: 1) contacting seedsavers and documenting heirloom varieties being maintained; 2) mapping "at risk" heirlooms by agroecoregions and ethnic groups; 3) conducting marketing and "value added" studies on heirlooms and products ; 4) documenting knowledge and expertise associated with heirloom varieties; and 5) facilitating the exchange of both germplasm and associated knowledge.

Research in 1998 focused on "memory banking", documenting over 200 heirloom seed savers' knowledge and expertise. Over 500 undergraduates in two anthropology classes at University of Georgia participated in memory banking with their families and neighbors. For our efforts in working with the Foxfire Fund of Rabun Gap, Georgia, the team was awarded the 1998 President's Award to non-Archivists by the Society of Georgia Archivists

Seed accessions grew by 200 in 1998 (see Southern Memories website (http://www.uga.edu.~ebl/sm). Twelve professional papers were given at professional meetings based on the project. Five journal articles and short research reports were published. A book, *Cultural Memory and Biodiversity,* authored by Dr. Virginia Nazarea, was published by the University of Arizona Press. Native Seed Search, a Bioregional Seed Saving project in the American Southwest, adopted the Cultural Memory approach of SLL.

SLL's outreach and education component involves building a region-wide network, outreach visits, field trips, exhibits, display gardens, publication of *Seedlink*, the 500-run bi-annual newsletter, seed swaps, a web site, and SSL sponsored workshops/conferences. Network data are stored in the Ethnoecology and Biodiversity Laboratory at University of Georgia. Two 500 copy editions (Winter and Spring 1998)of the newsletter, *Seedlink*, were distributed. Approximately 70 farmers, gardeners, and staff attended the second annual Seed Swap held in May at the Agrarian Connections heritage farm in Oglethorpe County, Georgia. The second SLL Garden was established at the Georgia State Botanical Garden where 33 varieties were planted and documented. SLL was listed in the two volume special reference briefs series on "Vegetables and Fruits: A Guide to Heirloom Varieties and Community-Based Stewardship" published by the Alternative Farming Systems Information Center, USDA. Project researchers participated in a dozen outreach activities, including an information and exchange booth at the 13th Annual Carolina Farm Stewardship Association Sustainable Agriculture Conference in Clemson, South Carolina. At the meeting, dozens of samples of seeds were passed on and received in turn.

Pass Along Southern Seeds (PASS) is a new initiative to promote the conservation through use of both cultural knowledge and heirloom plants by passing on seeds that have been conserved by Southern farmers and home gardeners and donated to SSL over the past two years. The aim is to connect seedsavers with home gardeners who are looking for old timey varieties, and to pass along heirlooms and knowledge associated with the plants as well.

The project is on target and has experienced no major difficulties. Research planned for 1999 includes finalizing the SSL resource directory of network members, including organizations, markets, and institutions. Ongoing marketing research will be intensified and completed by August. Mechanisms are being sought to continue the project after the first three year funding phase has been completed.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS96-79
Final Report
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Multi-Cropping Cattle and Watermelon in the Southern Plains

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SARE grant $54,752

Cattle and watermelons are grown extensively throughout the southern United States. Some farmers produce both commodities, but no one produces both crops on the same land in the same year. Farm diversification with cattle and watermelons would improve cash flow, minimize risks and lead to farm stability and sustainability.

The main disadvantage to cow-calf operations is that the income from small and medium sized cattle farms is not sufficient to maintain a desirable standard of living. Most farms in southeastern Oklahoma are 100 to 300 acres in size, and normally produce about $10,000 to $50,000 of gross farm income, with net profit being a fraction of the gross income.

Watermelons can produce gross returns in excess of $1000 per acre. While watermelons normally produce more income per acre than do cattle, much of the land planted to watermelon is subject to erosion when not kept under a plant cover. Watermelons should be grown in a given field no more than 1 out of 4 years to prevent soil-borne diseases that will reduce, or eliminate, crop yields. Because of this, watermelon growers need access to at least four times the amount of their annual watermelon acreage. Pasture land is unlikely to have a watermelon disease problem, and is thus desirable as a site for rotation with watermelons. However, most cattle farmers are unwilling to convert a permanent pasture into watermelons, and then re-establish the pasture after melon harvest is completed.

Most agriculture in southeastern Oklahoma involves cow-calf operations. Rainfall and temperatures are conducive to grass production, and markets are available throughout the year. Cattle production is also desirable from an environmental standpoint. Cultivated soils in the area are highly erodible by both wind and water, but permanent pastures keep vegetation on the soil and thus greatly reduce soil erosion. In Texas, watermelon producers can plant earlier and harvest later than can those in Oklahoma. This allows more flexibility in designing a multi-cropping system than could be done in Oklahoma.

A system is needed that would allow melon production in an established pasture or meadow for one year without damaging the stand of grass for the following years. An even better system would allow for production of both pasture grasses and watermelon on the same land in the same year. The purpose of this project has been to determine if watermelon and bermuda grass pastures can be grown in the same field in the same year. One approach to answering this question was to grow watermelon in strips in a perennial pasture or meadow. Only a small portion of the pasture was tilled and planted with melons, and the pasture was then allowed to return to grass. With this system, cattle producers can diversify their operations, minimize risk, and improve farm profits. Watermelon producers can reduce soil erosion and have a disease-free site for crop rotation.

Approach

Research has been conducted for three years in Oklahoma and Texas to develop such a system. Fields of bermuda grass have been used to grow both hay and watermelons. One technique has been to plant watermelons in the field as early as possible in the spring. Hay is grown between the plots at the same time, and after the melons are harvested, the entire field is allowed to revert to bermuda grass. Another technique is to get one cutting of hay from the field in the spring, and then after the hay is harvested, to plant strips of watermelon into the grass stubble. Grass is allowed to grow between the strips while the watermelons are being grown. The main difference in these two techniques is the timing of harvest for each crop. The first technique involves harvesting watermelons prior to hay, while the second technique involves harvesting hay prior to watermelons. Either technique has potential, and the choice of techniques is primarily dependent upon the market that watermelon growers are attempting to meet.

Results

After three years, we have demonstrated that both hay and watermelon can be harvested from the same field in a single year. The tilled strips that were planted with watermelons in one year may be covered with bermuda grass later during the same year, and will certainly be covered with grass the following year. We have not encountered a noticeable change in either insect or disease occurrence with any of the treatments in this system.

After three years of research, the main limi-

tation to watermelon growth seems to be weed control. Bermuda grass may be classified as a weed when it interferes with watermelon production, even though it is also classified as a crop when grown between the tilled strips or when it is grown before or after the crop of melons. If grasses are completely controlled in the tilled and planted row, broadleaf weeds may become a problem within the row.

One other concern that needs to be further investigated involves pollination of the watermelon. Observations in both Texas and Oklahoma have led us to believe that there may be insufficient pollination. This observation was particularly noticeable in 1998. If insufficient pollination did occur, there are two likely explanations. The first is that there may have been insufficient numbers of bees. During the past two or three years, there has been a dramatic decline in the number of native bees throughout the entire country, including Texas and Oklahoma. A reduced number of bees could have led to insufficient pollination. A second explanation, assuming that the number of bees was sufficient, was that the watermelon flowers were masked by surrounding grasses, and thus did not attract a sufficient number of bees per flower. A third explanation is that the extremely high temperatures that occurred during the time of fruit set in 1998 were detrimental to fruit set, even if a sufficient number of bee visits did occur. Further investigation is needed to determine the cause of low fruit set which occurred in 1998.

Contribution

The benefits expected from this project have been achieved. The system that has been developed will allow multi-cropping of both bermuda grass and watermelon. This system combines the advantages of a perennial crop with an annual crop. The system encourages crop diversity, and utilizes the advantages of crop polyculture. The system allows the production of a crop that is normally grown by clean culture without subjecting vast amounts of soil surface to erosion by wind or water. The system allows crop rotation within a given field, and thus lessens the chance of pathogen or parasite accumulation. The system allows production of a high value horticultural crop and a perennial soil-covering forage from one field in one year.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS96-80
Progress Report
December 1998

Alternative Agriculture Strategies for Rural Community Sustainable Development in Northhampton County, Virginia

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SARE grant $228,517

Objectives

1). Establish communication network which explores and shares the benefits from and perceived barriers to adopting sustainable agriculture with growers on the Shore, reaching beyond the agricultural community to include other sustainable development and marketing efforts.

2). Identify and evaluate agricultural and economic opportunities including adaptation of sustainable techniques, identification of constraints, development of risk analysis, and evaluation of market strength and potential.

3). Facilitate implementation of on-farm demonstration sites using alternative technology or crops.

4). Conduct research, analysis and feasibility studies to assist farmers in transition to alternative crops and/or technology and the production of value-added products.

5). Evaluate the success of this project by monitoring a) the farmers attitudes and perceptions of agricultural, environmental and quality of life issues and b) the local citizens' perceptions of sustainable agriculture's role in this rural community's vision.

Work Accomplished to Date

A diverse group of participating growers managed eleven, second-year demonstration plots using sustainable technology or producing alternative crops. Projects included: Hayman sweetpotatoes, seedless melons, dried flowers, cut flowers, deciduous holly, kenaf, organic soybeans, lettuce, broccoli, and mixed vegetable community garden production. Growers are supported by an interdisciplinary technical team from research and extension.

Hayman sweetpotatoes are an Eastern Shore heirloom variety which has potential, through marketing, as a premium product. Virginia Eastern Shore Corporation is expanding its value-added, branded marketing in the Mid-Atlantic region and is also conducting concurrent test production/marketing of Hayman chips, utilizing the smaller roots. Participating growers are using best management practices. Last year's grower has expanded his involvement by growing extra seed stock and helping other growers. They are developing marketing opportunities through the Internet.

The dried flower demonstration plot has expanded, using zoned drip irrigation and value-added marketing to provide supplemental income. Both the quality and quantity of the crop has improved this year. Networking with community-based groups and artisans is establishing value-added local enterprise opportunities.

Production and test marketing for seedless watermelons was expanded, with both certified organic and other sustainable management strategies providing comparative information. The organic grower increased acreage and marketed the crop for a premium. The other grower marketed his pollinator melons through the regional "Shore-to-Store" marketing program while his seedless melons were included in another SARE project's regional test marketing program.

Bayview Community Garden developed from a community action initiative. Their goals are to plant and grow quality foods for low-income residents, reducing expenditures for food and, eventually, generating income for the community. The Bayview Garden Committee was able to harvest fresh vegetables to supply 20 participating residents, providing a sense of empowerment, fulfillment and reconnection to their land.

An economic and environmental computer model analysis was used to assess kenaf as an alternative crop. The model was effective in assessing risks associated with a new crop without growers investing time, inputs and land. Other crops can now be assessed.

Work Left to Do

Participating growers must evaluate their selected enterprises. Results will be used to develop enterprise budget guides and fact sheets.

Additional crops and strategies need to be investigated with participating grower demonstration plots. Additional growers are interested in getting assistance with organic certification and other sustainable methods.

A socio-economic survey was developed to measure initial attitudes and perceptions of barriers to adopting sustainable agriculture on the Shore. Participating growers will be re-interviewed to collect follow-up data.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS97-82
Progress Report
December 1998

Sustainable Crop and Livestock Systems in the Texas High Plains

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Seed Resources
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SARE grant $222,125

Objectives

1. Compare productivity, profitability, and impact on natural resources of continuous cotton systems, all forage-livestock systems, and an integrated cotton-forage/livestock system.

2. Involve local producers and industry in identifying researchable needs, in developing and testing systems of production, in the development of more effective dissemination of information to end users, and enhanced adoption of new technologies.

3. Link this research with sustainable systems research in other ecoregions to increase the base of knowledge and understanding of the principles that apply to integrated systems.

Approach

Texas High Plains crop production has used precipitation and supplemental irrigation with water pumped from the Ogallala aquifer at rates that far exceed recharge for many years. Over 20% of the U.S. cotton *(Gossypium hirsutum)* crop is produced in this once vast grassland. Most of this cotton is produced in monoculture systems that are economically risky and contribute to wind induced erosion and depletion of ground water resources.

Although large numbers of cattle are found in this region, little integration of livestock and crop production exists. Integrated crop-livestock systems could improve nutrient cycling, reduce soil erosion, improve water management, interrupt pest cycles, and spread economic risk through diversification. Cotton yields per acre may be increased through complementary effects of forages and livestock.

Thus, three systems are compared: 1) a Conventional Irrigated Cotton System using best management practices; 2) an All Forage-Beef Stocker Cattle System to produce feedlot-ready cattle; and 3) an Alternative Integrated Crop-Livestock System for production of both cotton and stocker steers.

The Alternative System integrates cotton in rotation with forages for grazing by steers. Criteria for evaluating these systems includes plant and animal product quantity and quality, net profits, water use, soil conservation and fertility, and input requirements including pesticides, fertilizers, and mechanical operations.

Producer cooperators provide on-farm testing of both the systems, help to identify researchable needs and provide outlets for information to producers and industry.

Establishment of the replicated Conventional Cotton System and the Alternative Crop Livestock System began in July of 1997. Soils were sampled in each paddock to determine fertility and presence of soil-borne pathogens. A drip irrigation system was installed and each paddock was equipped with a meter to measure water applied. Drip tapes are located on 40 inch centers and are buried about 14 inches deep. The irrigation system was completed in January, 1998.

In autumn of 1997, wheat and rye were established on the Alternative System. Wheat was also planted in furrow bottoms between listed rows for Conventional Cotton. Because the project area was not ready to begin grazing of cattle at this point, the wheat and rye for the Alternative System were harvested for hay in the spring of 1998. Sorghum was no-till drilled into the wheat stubble using a Tye stubble drill. The first cotton crop was established on the Conventional and Alternative System in spring of 1998 using Roundup-Ready Cotton. Cotton on the Alternative System was no-till drilled into the rye stubble on level ground. Conventional Cotton was planted into beds between the terminated wheat. Cotton yields during this first year of the project were 2.7 and 2.4 bales per acre for the Conventional and Alternative Systems, respectively. Total irrigation water applied to cotton from planting to harvest was 23.7 and 17.3 inches per acre ($P<0.01$) for the Conventional and Alternative Systems, respectively. Weed species and numbers were measured for the two cotton systems during the 1998 growing season and data will be collected throughout the experiment to determine species shifts that result from the various production systems.

During the summer of 1998, fencing was completed on all paddocks. Old world bluestem perennial pastures were planted in early June for the Alternative System. Excellent stands of bluestem were obtained and bluestem seed were harvested in October. In October, boll weevil cages were placed within the bluestem and rye pastures to determine effects of these forages on overwinter survival of the weevil. Angus and Angus X Hereford steers will begin grazing the small grains and bluestem on the Alternative System in December, 1998.

The Hometown Creamery Revival

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SARE grant $145,474

The Hometown Creamery Revival (HCR) is exploring the revitalization of small-scale dairies and rural economies in the southern Appalachian mountain region through creation of unique, ecologically produced dairy products to be offered in local and regional outlets.

According to *Hoard's Dairyman*, 8% of all dairies in the U.S. went out of business between July 1997 and July 1998. The southern region lost 9%. In Virginia, half of the dairies that folded were the small dairies of the mountainous southwest region. This is a critical blow to the small-scale farmers of this region.

A major purpose of the HCR project is to fill in some of the gaps in information available to small-scale dairy farmers interested in profitable processing and direct marketing possibilities. Steven Jenkins' *Cheese Primer* lists only seven small-scale cheesemakers for all the states included in Southern SARE – the same number he lists for New York alone. Although not a comprehensive list, this is an indication of the potential for expansion of value-added dairying in the South. By gathering and providing information on facilities, small dairy resource materials, knowledge of value-adding processes, food safety, business management and marketing methods, the HCR educates its own participants and reaches other interested people, including farmers, university personnel, extension agents and others.

Another focus of the HCR project is protection of the farm environment, including improvement of pastures and water quality, as well as humane animal care. Through pasture walks, seminars, conferences and reading materials, project participants are learning a great deal. Several members of the project have become members and regular participants in grazing groups organized by The Virginia Forage and Grasslands Council. The coordinator has written several articles in an effort to extend this knowledge to the wider farming community, as well as to let consumers know that the farmers are participating in this training and making changes on their respective farms.

Education of end-users about locally produced foods and HCR project cheeses, in particular, has begun this year, on a very small scale. Two of the five participating farms operated cheese plants in 1998, and both successfully marketed their cheeses directly, so it hasn't been necessary to make a large coordinated effort to educate consumers, who are quite happy to purchase these cheeses when they taste them! However, it is curious how little people know about sources of dairy foods, and the face-to-face contacts between producers and customers offer precious one-on-one teaching opportunities.

Small-scale dairy farms have, in the past several decades, been relatively isolated as they have plugged into the larger system, providing bulk quantities of milk for a determined price over which the farmers have no control. The Hometown Creamery Revival project has successfully begun to weave the web of relationships which will support these farmers in their efforts, give them more control over their products and their income, and bring to end-users a local, unique supply of dairy foods. Thus far acceptance has been excellent, and we are seeing demand outstripping supply in most cases. This is encouraging for those who are still working on their own plans to bring their processing facilities into being. An informal mentoring network has been developing between participating farmers, and with others outside the project, as they develop their skills and share their knowledge. This is one of the most exciting features of this project!

In 1999 the Hometown Creamery Revival will expand its influence to more dairies as we make available some of the materials that have been evolving since the beginning of the project. We also anticipate an increase in the connections between farmers and consumers as more dairy products flow direct from the farm.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS97-84
Progress Report
December 1998

Regionally Centered Sustainable Agriculture System

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SARE grant $173,240

Buddy Thomas runs the Castlewood Farm Supply, in Russell County, Virginia. At a Spring meeting to launch a new farmers market, Buddy discussed an organic soil amendment with the 12 local farmers in attendance.

One farmer asked, "Buddy, what exactly does that stuff do?"

"You see" Buddy replied, "you all buy chemical fertilizers from me, and they make your crops grow. But they kill the life in your soil. Now you're coming to me to buy this soil amendment to bring that life back." Buddy then mentioned how Appalachian Sustainable Development provides farmers with practical help to farm more sustainably.

This story illustrates how hands-on tools for sustainable agriculture, along with networks of farmers and resource people can foster changes in the agriculture establishment from the bottom up.

Appalachian Sustainable Development's Regionally Centered Sustainable Agriculture project has three main goals: to develop markets for fresh produce, meats, and value added products; to facilitate farmer-friendly research in sustainable agriculture practices; and to broaden public understanding and support of sustainable farmers and agriculturral entrepreneurs. Progress on these three goals, which continue to provide the framework for our work, is discussed below.

Development of markets has included expansion of existing markets – restaurant sales have increased by nearly 50% in 1998 – as well as cultivating new opportunities, including two farmers markets in Lebanon and Pennington Gap, Virginia.

Two organic pepper products were chosen for inclusion in the Autumn, 1999 catalog of Williams Sonoma. This $25,000 initial contract resulted from collaboration between an innovative farmer and ASD marketing staff. Test marketing of value added crops, begun this year, will be greatly expanded in 1999 utilizing a $36,000 market analysis and development grant secured from the Appalachian Regional Commission.

Negotiations are under way to supply a local grocery store chain which is opening an organic section in ten stores.

Markets for local meats were limited more by supply than demand, which is growing.

Efforts to create a fourth Community Supported Agriculture project failed during 1998. Consumer support for CSAs in our region varies, growing in some areas, declining in others.

Research and technical assistance took place on 12 different farms, examining: production and marketing of garlic and cut flowers; tomato blight and cucumber beetle control; low cost fencing and watering systems; and establishment of warm season grasses for pasture improvement. Initial results have generally been encouraging and research will continue in 1999.

Research design will be simplified in 1999, in response to farmer concerns. Several extension agents have agreed to assist with design and management of experimental plots.

Education and outreach efforts included 26 work shops involving nearly 400 participants. Ten different farms in the region provided venues for these workshops which drew in many conventional farmers, as well as those involved in or in transition to organic production. Farm based apprenticeships, food fairs and other public education efforts also got underway in 1998.

Appalachian Harvest, a directory of sustainable producers in the region, was developed and disseminated.

While there is much work left to do, the outreach to farmers and the ability to demonstrate practical alternatives and emerging markets is already yielding results.

We are very excited about increased collaboration with Cooperative Extension, NRCS and other agencies. This institutional support has grown faster than we anticipated, and includes joint efforts in research, education and market development.

Evaluation of benefits to farmers is underway, as is an examination of the broader impacts we are having on the agriculture community. An evaluation earlier this year led to creation of a new position focused upon limited resource farmers, a shift that has already proved helpful.

Editor's note: A very detailed report of this project's 1998 activities and 1999 plans is available from the SARE office at (770) 412-4786).

SARE
Sustainable Agriculture Research and Education
Southern Region

LS97-85
Progress Report
December 1998

Impacts on Agricultural System Sustainability from Structural Change in Peanut, Poultry, Swine and Tobacco Production Systems

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SARE grant $174,858

Project collaborators are using secondary database analysis and coordinated case studies to examine four major Southern farm commodities—poultry, hogs, tobacco, peanuts—to analyze major trends; to assess the impacts of these trends on the structure of agriculture, community well-being, and environmental protection; to determine reasons for both success and failure as farmers attempt sustainable agriculture processes (including diversification); and to outline resources needed by farmers in adapting to major trends. Trends to be analyzed include changes in government programs and regulations, trade agreements, market-driven structural changes, and shifting consumer demands.

Objectives

1.) Document changes in the structure of the peanut commodity system and the responses of peanut farmers to these changes, with a focus on a peanut growing region and associated rural communities;

2.) Document the effects of vertically integrated contract poultry production on the lives and livelihoods of contract poultry farmers and their communities, including documenting the failure of a "free-range" poultry business in North Carolina and conducting a follow-up study of Louisiana poultry communities;

3.) Document changes in the structure of the tobacco commodity system, the responses of Kentucky and North Carolina tobacco farmers, and how structural shifts are affecting the quality of life in tobacco communities;

4.) Identify changes in the structure of agriculture correlated with the development of intensive hog confinement agriculture in Eastern North Carolina and the associated changes in community quality of life, paying special attention to changes in social capital and community conflict.

Accomplishment to date include collection of secondary databases, literature review, and data collection from case studies through surveys, interviews, focus groups, community meetings and field notes. All of these steps are ongoing at this point as is interpretation of the data. The project is designed to help farmers and technical assistance providers adapt to structural change in these four key agricultural production systems.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS97-86
Progress Report
December 1998

Equal Access to Agricultural Programs and Opportunities

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SARE grant $151,290

Minority farmers, facing farm crises, discrimination, and neglect, are on a long road to extinction. With them goes the largest source of minority-held equity in the South, and an important base of economic development. Groups fighting this discrimination believe current socioeconomic conditions make it more essential and feasible to replant minority farmers and communities on the land.

Objectives

This project works to: (1) broaden collaboration among minority and limited resource producers in the South; (2) enhance their participation in USDA sustainable agriculture, marketing and other programs; (3) develop, with USDA, strategies to identify barriers to participation and enhance outreach and services to these producers; and (4) strengthen networks, strategies, collaborative projects and methods to increase the viability and number of minority producers.

Collaborators include major minority farm organizations in the South, with cooperation from USDA entities and educational institutions. The Land Loss Prevention Project manages and staffs the program. The training components are coordinated by The Rural Coalition/Coalición Rural, a culturally and regionally diverse alliance of over 100 community-based farm groups, including all those participating in the project. The newly formed National Council of Community Based Organizations in Agriculture serves as the advisory committee for the program and in seeking strategic changes within USDA.

The collaborators have worked closely with USDA on the development and implementation of the Civil Rights Action Team Report and on the National Small Farms Commission Report as well as to establish ongoing partnerships between USDA and community-based organizations. Participating groups worked with the Department to encourage policy makers to waive a Statute of Limitations that prevented USDA from settling outstanding civil rights cases. They have also cooperated to find resources for collaborative work, including marketing and enhancing minority farm participation in the FSA county committee system and in risk management.

In the final project period, the participating groups will come together for the 1999 USDA Training Institute in Washington, DC, and for two regional training programs on cooperatives and marketing, including use of the Internet. The Training Institute will include dialogue with USDA staff in strategic program improvement. Participants will be eligible for small grants for strategic grassroots work to improve local USDA program participation.

(Editor's note: A very detailed report about the 1998 activities and plans for 1999 is available from this project. Contact the SARE office at (770) 412-4786 for a copy.)

SARE
Sustainable Agriculture Research and Education
Southern Region

LS97-87
Progress Report
December 1998

An Integrated Vegetable Production, Postharvest and Marketing System for Limited-resource Farmers in South Georgia

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SARE grant $ 134,800

Objectives

1) Design, test, implement, and disseminate information on 24-hour field to consumer integrated postharvest and marketing systems.

2) Compare the quality of produce and economic performance of the 24-hour system to other important marketing systems practiced by south Georgia vegetable farmers.

3) Develop appropriate production system information leading to the expansion of production systems of limited resource farmers to include nontraditional vegetables.

Approach

Creating an environment for effective communication among farmers and between farmers and research and outreach personnel remains central to the project. Formal and informal meetings are used to discuss the system and address opportunities and constraints. Project participants have begun mapping the flow of product from the field to the retail outlet. The motivation for the development of the proposal was to assist limited resource farmers in accessing markets that have been traditionally difficult for them to secure. The farmers have been successful at growing high-quality vegetables for the retail outlet. Coordinating the shipment of mixed loads of vegetables from a number of different farmers has been a challenge. Assuring similar packaging and appearance of produce from different farmers has required special attention. Workshops and discussions on uniformity of produce have been initiated by the farmers with the assistance of the agency collaborators.

The ability of farmers to produce high quality produce has bolstered confidence that the 24-hr field to consumer system can expand marketing opportunities for limited resource farm families.

A fundamental premise of the project was to take a market-driven approach that would link limited resource farmers to retail food outlets. Ironically, several retail food outlets were and continue to be anxious to work with this group of farmers. Thus, a barrier to effectively access these retail customers has been quickly overcome. Project collaborators (including farmers) are collecting market data that compare prices of commodities at different stages of the system. These preliminary data have been useful in deepening the understanding of the complex relationships between the source of the commodity, terminal and retail market, and prices.

The farmers in South Georgia have experience producing a wide range of vegetables. In order to build upon their knowledge and experience, the farmers have begun to experiment with the production of a number of alternative crops. Radishes, carrots, beets, and bunch onions have been planted by cooperative members participating in the project. Farmers have exchanged experiences of the culture of these vegetables and with the assistance of outreach and research personnel from the collaborating agencies, continue to evaluate appropriate production technologies and strategies. Training materials and approaches are being developed that stress hands-on learning and demonstration on how to handle produce. Personnel are tailoring the training activities to the needs of farmers in the project.

Collective action to secure markets and coordinate information exchange has been identified as crucial to the success of the operation. A program in effective group dynamics has been developed and is being used by farmers, community leaders, and research and outreach personnel. Conflict resolution, effective membership participation, strategic planning and effective communication are some of the components of the program.

We will continue to design and develop the system, build trust and effective working relationships between project collaborators, encourage farmer evaluation in the expansion of the number of crops produced by the farmers, offer training in appropriate postharvest handling, and collect market price data.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS97-88
AS97-26
Progress report
December 1998

Producers Assessment of Sustainable Land Management Practices to Protect Water Quality

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SARE grant $228,864

Our team of agricultural producers, educators, researchers, and students developed this project to determine sustainable management practices that protect water quality and to identify incentives needed for producers to adopt such practices. To do this, we work toward four objectives:

Objective 1: Assess spatial and temporal distribution of N and P in the Rose and Greenbrier Creek watersheds, as related to land management practices. We completed site selection and characterization on cooperator's farms and research plots and installed runoff small in-field collectors and stream collectors. We continue to gain new cooperators to add management practices or to sample critical locations within the watersheds. The original design of the runoff collectors was modified to improve quantitative sampling on steeper slopes, including: reinforcement to maintain a level base, addition of a fluted bar above the splitters to ensure sheet flow, leveling devices, and accessible in-ground water containers. Calibration indicated the collectors captured 9.8-11.6% of flow in the 10% container across a range of slopes and flow rates. The 1% container captured 1.5-2.5% across the same range of conditions. Stream collectors were installed at farm sites, and about 10% remain to be installed in strategic landscape positions not associated with fields. An automated weather station was installed in the Greenbrier watershed. Bimonthly stream sampling will begin in December, 1998 and storm events will continue to be sampled. We have had few runoff events due to low rainfall since May, 1998. Digital topographic maps were imported into Imagine and rectified, and four maps were joined. From the joined digital raster graphic, stream networks and watershed boundaries were digitized. Digital elevation models were imported, rectified, and joined and shaded reliefs created. The first annual meeting for farmers, researchers, and educators to discuss the data, as well as the process of collecting the data, is planned for January, 1999.

Objective 2: Compare volunteer water quality data collection to technician data collection, and test kit measurement of N and P concentrations to laboratory analysis of the same samples. Test kits were calibrated in the laboratory and field. Twelve farmers have had one or more training session. Additional training will be offered to new cooperators. Because of limited runoff data, comparisons of kit vs. laboratory data and volunteer vs. technician data have not begun.

Objective 3: Evaluate incentives needed to encourage producer adoption of sustainable management practices. A pre-survey about land use/land management impacts on water quality was developed and administered to project participants (farmers, researchers, educators, students). New participants complete the survey prior to beginning work on the project.

Objective 4: Increase awareness among agricultural producers, youth, and the community of nutrient movement through the environment and of potential impacts on water quality. A workbook was developed about nutrient cycling within Southern Piedmont watersheds, particularly as related to agriculture. Sampling protocols and test kit procedures were also described. Farmers cooperators have copies of the workbooks. Training was offered and workbooks distributed to about 75 farmers at Fort Valley State University to the Small and Beginning Farmer Conference. Additionally, extension agents in Southern Piedmont counties of Georgia have copies of the workbook. Oconee County High School FFA established an Adopt-a-Stream project in the Greenbrier Creek watershed and the Science Club has an Adopt-a-Stream project in another watershed. Team members provided training at the Georgia Adopt-a-Stream Annual Conference about our efforts to monitor impacts of agriculture on water quality. Two researchers and a producer described our project to the SARE Kentucky Agriculture Water Quality Action Plan Leadership Training Meeting in November.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS97-89
Progress Report
December 1998

Integration of Freshwater Prawn Nursery and Growout System Into Diversified Farm Systems

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SARE grant $155,197

The U.S. imports in excess of $2.5 billion in shrimp products each year. To try to address this need, culture of a freshwater prawn is being evaluated. Compared to marine shrimp prawns have the advantages of not being restricted to coastal regions, have less environmental impact, and can be raised close to large markets. However, due to a temperature restricted growing season it is essential that prawn production rates (pounds/acre) be maximized. Studies have shown that as territorial animals, the major constraint on prawn production is the amount of two dimensional space available per animal.

Objectives

1) Determine whether zooplankton hold potential as supplemental foods in nursery tanks.

2) Evaluate the growth of finfish species in nursery tanks after prawns are stocked into ponds.

3) Evaluate the polyculture of freshwater prawns with tilapia in cages, yellow perch in cages, and winter rotation of rainbow trout.

4) Determine the effects of added substrate on freshwater prawn production in ponds.

5) Evaluate the economics of production and marketing of freshwater prawns.

6) Evaluate different market potentials and distribution strategies for different product forms (live, fresh, and frozen).

All objectives have so far been addressed except the hydroponic portion of Objective 2 which will be initiated in Spring 1999.

Results

Results from Objective 1 indicate that maintaining live zooplankton in prawn nursery tanks significantly improves prawn growth and survival.

Data from Objective 2 indicate the yellow perch readily adapt to high density tank culture and that 75EF is ideal. Paper accepted for publication in the Journal of the World Aquaculture Society.

Objective 3. Study 1 (Harkins Farm) found that Tilapia are suitable as a polyculture crop in prawn ponds and that unprocessed distillery byproducts can be used as a direct feed producing cheaper gain (16ç/lb of gain) than commercial feed (33ç/lb of gain).

Study 2 (Straw Ridge Farm) found that the polyculture of yellow perch in cages in prawn production ponds appears to be a viable production alternative. Increasing stocking densities from 80 to 320 fish/m^3 significantly increased fish growth and feed conversion.

Objective 4. Added substrate (plastic safety fencing) was used to increase available surface by 0, 40, 80, or 120% (3 ponds each). Added substrate (80%) increased prawn production by 318 pounds per acre (32%) without decreasing average sizes. Survival and feed conversion were also improved (15%). In commercial ponds (Bluegrass Shrimp Farm) added substrate increased production 745 lbs per acre (75%).

Freshwater prawn enterprise budgets (Objective 5) were developed based on interviews with producers. The budget suggest that conventional systems should generate $2,600-3,694 per pond-acre. New budgets will be developed based on added substrate.

A feasibility study for an in-state prawn nursery and/or hatchery is ongoing. Preliminary findings suggest that at least a nursery would be viable and could lower stocking costs by 50%.

Objective 6. Surveys were sent to fine-dining restaurants. Chefs in the higher rated restaurants were most interested. Year-long and holiday availability and large sizes were important. There is interest in fresh or live product. The interest level appears to be at least as strong within ethnic Asian restaurants.

Interviews were also conducted with 12 seafood wholesalers and retailers. Retailers were very interested in conducting in-store sampling, merchandising, and in featuring a locally produced fresh product. Sizing, packaging, and processing are important in these markets. Direct marketing through these retailers would be difficult except among small independent chains.

Interest among wholesalers was increased in response to the results presented from the fine dining survey. Wholesalers and retailers indicated a strong distribution system would be important. Demand and product awareness efforts should be focused principally on consumers and chefs; wholesalers and retailers appear willing to follow. Current work involves more detailed sensory evaluation of the freshwater prawn.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS98-90
New Project
December 1998

An Integrated System of Organic Food Production and Urban Food Waste Recycling Using On-Farm Anaerobic Digestion and Fertigation

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Rosie's Organic Farm
Rosie Koenig

SARE grant $142,623

Organic farms are concerned with procuring organic soil amendments while communities need to expand recycling. Food wastes are a rich source of plant nutrients and energy. Generally these wastes are disposed of in landfills where they produce leachates and volatile emissions. Anaerobic digestion of food wastes eliminates these problems and provides an inexpensive source of fertilizer and energy. This is important to organic farmers who pay five to ten times more per pound of nitrogen compared to conventional farmers and have few sources of organic, liquid fertilizer. This two-year project will use anaerobic digestion to recycle urban food waste on-farm.

Objectives

1) Implement an integrated system to recycle nutrients and organic matter through on-farm anaerobic digestion of urban foodwaste;

2) Evaluate liquid fraction fertigation methods with regard to biofouling;

3) Test the agronomic response to the liquid fraction;

4) Determine the economic feasibility and logistics of this concept from waste collection to nutrient reuse;

5)Educate farmers, waste haulers, environmental regulators, restaurant owners and extension personnel about this concept.

Approach

Possum Hollow Farm will receive food waste from restaurants and recycle it using anaerobic digestion, fertigation of the liquid fraction and land application of the solid fraction. Field trials comparing growth responses to the digester liquid fraction and other organic fertilizers will be conducted at two additional farms and one research farm.

Training for farmers,educators, food processors, and environmental regulators will occur at field days and workshops. The Cooperative Extension Service will coordinate education with farmers and state and national organic certifying agencies. This practice could provide a new source of liquid, organic fertilizer, create a new revenue source for farmers in the form of on-farm tipping fees, and divert a significant proportion of food waste from landfills.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS98-91
New Project
December 1998

Development of Decision Support Systems for Improvement of Silvicultural Practices on Farm-Based Non-Industrial Private Forests

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SARE grant $26,204

Limited-resource farmers own a significant fraction of the forestland in the southeastern United States. Projected increases in timber harvest on these lands simultaneously present opportunities for economic benefits and challenges for sustainable production. Forests have the potential for playing an increasing role in the economic well-being of limited-resource farmers.

However, if regional patterns of opportunistic rather than planned, harvesting continue, and if failure to attend to regeneration and stand growth remains the norm rather than the exception, increased harvesting rates will lead to the degradation of the economic and environmental values represented by farm woodlots.

Objectives

This one-year planning project will provide the necessary background for development of a decision aid system to assist farmers in managing forest lands in an economically sound and environmentally sound manner.

Approach

A multi-disciplinary team of researchers from the natural resource and social science disciplines from 1862 and 1890 land grant universities will review and synthesize existing literature and survey individuals conducting pertinent research to assess the validity of previous studies, identify ongoing projects and determine future research needs. Planning sessions will be held in Raleigh, NC, and Athens, GA, to identify the array of individual organizations necessary to build partnerships and create structures for farmer involvement in the development and dissemination of decision support tools.

County visits will be conducted in the Coastal Plain of North Carolina and Piedmont of Georgia to assess attitudes and values of farm-based forest owners and characterize economic and information constraints and opportunities for improved forest management. Results from literature review, research survey and county visits will be used to improve the problem of definition and approach of an integrated systems proposal for decision support and technology transfer to limited-resource forest owners for future funding.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS98-92
New Project
December 1998

Development of Sustainable Cropping Systems for Canola on Limited-Resource Farms in Alabama

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SARE grant
$124,488

Objectives

The project has the following four objectives:

1.) Monitor the effects of cultural practices;

2.) Develop sustainable cropping systems for canola in sequences with other crops;

3.) Compare conventional and no-till planting systems in canola production;

4.) Develop information about the economics and profitability of canola.

Approach

To answer these objectives, several canola field experiments were planted at the Alabama A&M University Agricultural Research Station, and on private limited-resource farms at two other locations for on site demonstration. These experiments are designed for planting date, seeding rate, nitrogen requirements, weed control, conventional tillage versus no-till. Information on the two demonstrations on private limited resource farms are provided to our cooperators in the Department of Agricultural Economic, at Alabama A&M University in order to fulfill objective number four.

Good fall stand for all canola experiments was observed despite failure of rain and the lack of adequate soil moisture. Paul Mask, extension agronomist, Auburn University has been contacted and he will carry out agronomic trials on spring canola in central and southern locations in Alabama.

The canola research project is also providing training for graduate students with interest in seed production and agribusiness. Two undergraduate students and Alabama A&M university cooperative extension agents are also involved in the project activities.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS98-93
New Project
December 1998

Accountability at Local, State and Federal Levels for Impacts of Agricultural Conservation Practices on Water Quality

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SARE Grant $233,322

Policies of the 1996 Farm Bill addressed many natural resource concerns and mandated programs to support animal-based agriculture and grazing land management. Soil and Water Conservation Districts (SWCD) work through Local Work Groups to identify high-priority natural resource problems and propose solutions using funds from the Environmental Quality Improvement Program (EQIP). Under the Government Performance Reform Act, federal conservation programs must be evaluated with measurements relating to the quality of natural resources. There is a need to assess how these policies impact programs designed to improve or protect the quality of our natural resource base. To accomplish this, we are working toward three objectives:

Objectives

1.) Work within two FY97 EQIP Priority Watersheds to monitor impact on water quality as funded conservation practices are installed.

2.) Examine monitoring methods at three geographic scales to develop strategies for use by local, state, and federal agencies.

3.) Conduct training for SWCD supervisors, farmers, staff members of NRCS, Georgia EPD, and other agencies to demonstrate sampling strategies.

Accomplishments

Two valuable sources of baseline data were found to supplement our work within the Upper Oconee Watershed of Georgia. First, The GA Environmental Protection Division collected water quality samples monthly in 1996 in the northern portions of the watershed. We can adapt our sampling sites to match some of these sites. Secondly, Georgia Power tested the water quality in the southern portion of the watershed once every two weeks in 1995. They have made the data available and we can adapt our sampling sites to match some of the previously used sites. This means that we have additional observations for testing for efficacy of funded agricultural conservation practices. Additional data are available at a few sites within the watershed. Approximately 20 years of water quality data were acquired to characterize the North Oconee as it flows into Athens. Data are also available on the Oconee River south of Athens for the same time frame. These data will provide additional ways to test for long term effects of conservation programs.

At the Conservation Center, sites have been selected and water quality samples have been tested for approximately a year for total coliforms, E.coli, and enterococci bacteria moving from grazing lands and forested areas into surface waters. Analysis for E. coli and enterococci seem to be more useful in identifying the effects of grazing animals in a watershed. A pond in the grazed watershed was effective for reducing concentrations of E. coli and enterococci bacteria in surface waters.

The project activities have been identified by the name ORBACE (Oconee River Basin Agricultural Conservation Efficacy). To facilitate communication as the project gets underway, an email list (send mail to *Dwight_Fisher@Scientist.com*) and a web site (http://www.spcru.ars.usda.gov/orbace1.html) have been established.

A graduate student (Candace Stoughton) working with Dr. Usery at UGA has already begun some of the geospatial analysis that will be important in the interpretation of our research. Two recent satellite photos have been purchased with ARS funds and provided to her for watershed analysis.

Remaining Work

Sampling sites must be located within the watershed and additional sampling sites must be located on the Conservation Center. Automatic sampling equipment must be purchased and installed at a subset of the selected sites.

Additional field and laboratory equipment must be purchased for water quality analysis. A temporary employee will be hired to assist in sample processing.

SARE
Sustainable Agriculture Research and Education
Southern Region

LS98-94
New Project
December 1998

A Model for Long-Term, Large-Scale Systems Research Directed Toward Agricultural Sustainability

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Quality

This three-year project will establish in perpetuity a multidisciplinary systems research project evaluating five diverse systems, through the collaboration of a broad coalition of researchers, extension personnel, farmers and stakeholders.

Systems to be studied include:

1. Successional Ecosystem;
2. Plantation Forestry;
3. Integrated Crop/Animal Agroecosystem;
4. Organic Agroecosystem;
5. Conventional Cash Cropping Agroecosystem.

Approach

The systems will be evaluated on numerous integrating parameters including energy, and nutrient flow within the plant-soil system, biological-based shifts, and economic performance evaluations. Data collection will cover the broad range of factors critical in agricultural systems, and include larger scale issues such as impacts on farmers and communities. In addition to establishing the long-term field study, we will conduct an in-depth analysis of methodology used in the design and evaluation of long-term, large-scale farming systems research which will ultimately result in a developmental model of such systems. The comprehensive model development will aid other states in designing agricultural experiments germane to their needs.

The project will be located at The Center for Environmental Farming Systems which is dedicated to the study of farming systems that are environmentally, economically and socially sustainable. The Center is a collaboration between NCSU, NCA&TSU, NCDA and other state and federal agencies, farmer and other NGO groups and citizens.

SARE grant $256,604

SARE
Sustainable Agriculture Research and Education
Southern Region

LS98-95
New Project
December 1998

Intergenerational Education for Sustainable Agriculture

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SARE grant $176,240

Objectives

1) Introduce the concepts of sustainable agriculture and its impacts on our environment, economy and community to students and teachers in our public school systems by establishing on-site educational gardens at pilot schools and in community gardens in six states.

2) Integrate local family farmers —especially limited resource farmers —and other farming professionals into educational activities at these pilot schools through the development of hands-on curricula for science, mathematics, literacy, economics, social skills, history and art based on sustainable agriculture activities. These farmers and professionals will be introduced to students as role models for viable career paths and occupational choices.

3) Create a regional network, which could expand to a national network, that promotes sustainable agriculture education for young people by establishing linkages between the participants so they can communicate with and learn from each other.

4) Disseminate program results to other educational professionals and agricultural information providers so that successful programs can be adapted in other school systems and educational settings.

Approach

This project will integrate sustainable agriculture concepts and practices into the curricula of six schools and community gardens across the South. We will especially target the high number of disadvantaged youth in most of these locations.

Three of the pilot sites have existing garden programs.This project will help develop and integrate a structured sustainable agriculture curriculum at each of these sites. New garden programs will be initiated at the other three pilot sites. By working with both existing gardens and new gardens, and a wide range of students from elementary school to high school, we will have the opportunity to assess program delivery in a variety of settings.

Although each pilot program will be site specific, all will contain five main components:

1. Team Building for Sustainability
2. Workshops for farmers
3. Workshops for educators and community gardeners
4. On-site classroom learning program:
5. Visits by local family farmers and other agricultural professionals

The management of this program will emphasize simplicity and cost-effectiveness by having various components developed and tested in specific parts of the region and then replicated in the other states. Oversight will be under the direction of the steering committee of Southern SAWG with Savanah E. Williams coordinating the overall project. Additionally, Ms. Williams will be responsible for developing the garden-based curriculum. Keith Richards will be responsible for the development of networking, communication and information exchange, including audio-visual materials. The College of Charleston will act as fiscal agent.

The program chairperson in each state will work with the participating schools and community garden groups to develop the program using curriculum developed by a committee made up of local family farmers, educators, parents and family members interested in sharing agricultural knowledge, students, NGO representatives, Cooperative Extension personnel, and other institutional participants. Appropriate family farmers will be identified as partners. Once the participants have been identified, a planning meeting will be held to develop the educational program with a schedule of activities to implement the program, along with evaluation procedures.

The program will make use of all appropriate technologies as learning tools for youth and adults. Additionally, the program will promote informed dialogue of all participants in raising the visibility of the importance of bringing at least three more generations into the participation of production and marketing of sustainable agricultural products.

Each pilot location will be linked through several forms of interactive communication and cross-fertilization. Additionally, information will be exchanged through newsletter articles, and by sharing reports and learning materials.

Both self evaluations and program evaluations will be used to continuously improve delivery, helping to achieve long-term sustainability for the program.

SARE
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Southern Region

LS98-96
New Project
December 1998

Integrating Farmer-Driven, Value-Added Enterprises into Sustainable Agriculture Systems

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SARE grant: $120,590

Objectives

1. Identify both the keys and barriers to the successful development and marketing of farmer-driven, value-added products by conducting a survey of current farm-based enterprises producing and marketing value-added agricultural products.

2. Create an information bank of programs, services, facilities, and other business and entrepreneurial resources available to support farmer-driven, value-added enterprises through a comprehensive inventory. Establish the information bank in such a way that it can be maintained continuously by the NCAT/ATTRA program.

3. Drawing on the resources and systems identified, assemble a model incubator service that will help farmers, cooperatives, rural communities, and farm-based entrepreneurs hatch or expand businesses that add value to sustainably produced farm products.

4. Test the model incubator by applying the service to five clients interested in developing or expanding farmer-driven, value-added enterprises. Assess the effectiveness of the service and recommend improvements.

5. Disseminate the information gathered from this project to three audiences: a) farmers (especially small and limited-resource farmers), agricultural cooperatives, and farm-based entrepreneurs interesting in establishing value-added enterprises, b) researchers interested in investigating aspects of adding value to and marketing sustainable farm products, and c) state Cooperative Extension Services, agricultural information providers, and others in rural communities who are interested in accelerating the development of farmer-driven, value-added enterprises.

6. Pursue additional funding and organizational support to establish a permanent incubator service in the Southern region.

Approach

During the first year of the project, a survey of current farm-based enterprises producing and marketing value-added agricultural products will be undertaken.The survey will focus on identifying the systems and underlying concepts—rather than particular products or market niches—that are keys to successful enterprises. It will also be designed to identify barriers to success, opportunities for success, helpful resources, and possible training leaders.

During the first nine months of the project's second year we will compile an inventory of marketing, business and entrepreneurial resources — written materials, audiotapes, videos, individuals, organizations, facilities, services and networks — available to farm-based, value-added enterprises. ness organizations will be queried. Priority, though, will be given to those resources that the farmers and ranchers from the enterprise survey actually identified as useful. The inventory will be used to identify training leaders and appropriate resource materials for the incubator service.

The model incubator service will be designed to help farmers, cooperatives, rural communities, and farm-based entrepreneurs hatch new businesses or expand current businesses that add value to sustainably produced farm products. The incubator will provide technical business support and training services tailored to each client's need as requested.

To evaluate the incubator service, clients and service providers will fill out questionnaires before and after the service.

SARE
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Southern Region

LS98-97
New Project
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Introducing Alternative Crops into Traditional Cotton-Grain Farming to Aid Transition to Freedom-to-Farm Agriculture

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SARE grant $114,279

Objectives

1.) Design and evaluate crop rotations including cotton, southernpea, chile pepper and grain sorghum to maximize producer sustainability while reducing buildup of soil diseases and enhancing growth of rotational crops.

2.) Identify and quantify cultural practices (irrigation, fertilization, wind protection) that optimize pepper stand establishment, growth, yield, and quality.

3.) Develop management practices which reduce chemical application, and enhance physical and biological health of the soil.

4.) Integrate adaptive research results into chile pepper production system demonstrations and disseminate results to current and potential growers through their participation in adaptive research, on-farm demonstrations, field days and innovative educational programs.

5.) Evaluate direct impact of transitional rotation practices on activity of nematodes and soil microbes, crop productivity, and potential farm income; and evaluate socioeconomic consequences on family and community associated with widespread adoption of this cropping system by conducting appropriate impact analyses.

Approach

At a preseason meeting with cooperating growers and faculty, project details will be discussed carefully and growers will complete a survey about previous crop rotations, cultural practices, costs and returns, problems caused by current cropping system. The proposed project will involve comparisons between a cotton-chile pepper rotation, a cotton-southernpea-chile pepper-grain sorghum rotation, and cotton monoculture. Within this study, optimal cultural practices for chile pepper production will be determined. Chili Co-op members and small-acreage family farmers from Lynn, Lubbock, and Hale Counties have committed 8 farms for this work. We will tailor our methods to enable several small acreage family farmers who grow southernpeas, hand-pick chile and habanero peppers for local fresh markets to adapt the technology.

Similar cultural protocols will be followed when cotton, southernpeas or grain sorghum are planted. Fields will be sampled prior to planting and fertilizer applications made according to extension recommendations. Soil samples will be taken from each plot and analyzed for nitrogen, and general microbial activity, and plant parasitic nematodes (density of each genus), (Boehm, 1992) (Papavizas, 1975) (Specht, 1985) (Wheeler, 1995) . Nitrogen and irrigation will be applied by growers as is their usual practice unless otherwise stated. There will be four fields involved in a cotton-chile pepper rotation and four fields with the cotton-legume-chile pepper-grain sorghum rotation.

A number of cultural treatments will be superimposed on chile pepper fields in the rotation studies. The experiments will determine practices that result in highest chile pepper yields based on nitrogen (Aloni, 1991), irrigation and windbreak treatments.

Project evaluation will be obtained by discussion and written surveys from growers, families and scientists who initially identified the problems and conducted the research. After each growing season we will evaluate effects of the holistic system on potential farm profitability including grower perceptions on its manageability. We will assess the financial outcome of this project to determine micro and macro costs and benefits. We will evaluate the socioeconomic impact on different family types and a variety of businesses in each community. Adoption rate of the 4-year, 4-crop rotation and conservative cultural practices will be determined by surveying growers, county Extension agents and Farm Services Administration personnel. Evaluation principles of Drucker and Wilson will be applied (Wilson, 1976).

SARE
Sustainable Agriculture Research and Education
Southern Region

AS93-9 (LS93-56)
Final Report
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Using Soldier Flies as a Manure Management Tool for Volume Reduction, House Fly Control and Feedstuff Production

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SARE grant $51,250

Manure is the principal food of many insects, especially larval flies. The insect utilization aids in the natural recycling of manure and the insects produced are food for many larger animals. Several researchers have proposed using manure as a larval fly medium, thus producing high quality insect-based feedstuff, while reducing manure residues. These systems all required separate facilities and sophisticated separation equipment. The results were good, but too expensive to be practical. The system we report here utilizes wild populations of the black soldier fly, *Hermetica illucens* (L.), directly under caged layers. No separate facility or special equipment is needed for production or harvest. This is possible due to certain habits of this large wasp-like fly, i.e. it is not a significant pest (especially as managed in our system) and the migrations of the last immature stage facilitate a simple self-collection of the mature larvae (prepupae).

Soldier fly larvae have been fed experimentally to several animals, with larvae used to replace soybean or fish meal in a formulated diet. These feeding tests have involved chickens, swine and fish, and response has been good. The dried prepupae, as collected in this system, contain 42% protein and 35% fat. Fat and protein meal fractions were easily separated by a commercial rendering plant. Amino acid and fatty acid profiles of these fractions are favorable. Bull frogs were raised for two years (two trials) on this unique, live feedstuff and may be the best way to capture maximum value from this system.

The black soldier fly is an attractive manure management agent since it can (1) eliminate house fly breeding: (2) reduce manure bulk by half or more when compared to similar unoccupied manure; and (3) produce economically attractive quantities of larval based feedstuff. An earlier study with this soldier fly driven manure management system produced almost 1.2 lb of larvae per hen annually, from May to December. This would be 58 tons in a 100,000 hen high rise caged layer house.

The currently reported study tested this system in a 1900 hen, small scale high-rise layer house to determine feasability of transfering this technology to a full sized house. Configurations of collection systems were tested, as were manure clean-out dates to best manage the soldier flies and not have house fly outbreaks. Changes in plant nutrients in the manure caused by soldier fly larvae were determined. Colonizing of soldier flies was investigated and bull frog culture using the self-collected prepupae was tested.

The following conclusions were drawn from these studies:

1.) Establishment of a self sustaining soldier fly population was easily accomplished with one relatively small innoculation of larvae.

2.) Self-collection ramps 29" tall with a 35° slope performed very well. Steeper ramps were difficult for prepupae to climb. Overall the self-collection system worked very well in our small caged layer facility. Efficient collections would be possible with a ramp on each side of a full sized caged layer house.

3.) Almost complete house fly suppression was achieved with the naturally regenerating soldier fly population.

4.) House fly outbreaks occurred following hens installed in September and a manure clean out in August. These events presented house flies with abundant, SFL-free manure, and were the only times outbreaks occurred.

5.) Manure clean-out in February or March were desirable both for timely utilization on crops and for house fly suppression.

6.) Nitrogen content in manure residue from SFL is significantly less and phosphorous is not higher.

7.) Winter accumulation of very dry manure led to two problems not seen previously:

a. Prepupal soldier flies pupated in dry manure base and were not self-harvested.

b. A lesser mealworm outbreak occurred in the dry manure.

8.) Conclusion 7b points out that lesser mealworms do not survive in a typical robust SFL population. A recent national workshop on livestock and poultry pests identified the lesser mealworm as a key pest of broiler production. If broiler manure could be managed with soldier flies, then the broiler industry would have a bio-

logical control for lesser mealworms, as well as the benefits expected for caged layers.

9.) Preliminary attempts indicate that colonization of BSF is feasible. Management of wild BSF populations has proven very successful for our manure management system, but colonization of this insect would increase confidence in the system with those considering its adoption.

10.) Bull frogs were successfully cultured with an adult diet of live BSF prepupae offered with catfish fingerling diet. Our frog culture was loosely based on a successful commercial system from Latin America which uses expensive live house fly larvae.

Adoption of this system in confined animal feeding operations seems feasible. Economic returns could be significant and manure to be land-applied would be reduced over 50%. Access to the manure in modern high-rise caged layer houses by wild ovipositing females is problematic, but several solutions are possible. This system can readily be adopted to animal production more open to the environment.

SARE
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Southern Region

AS94-16
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Development of Guidelines for and Demonstration of Efficient Treatment of Swine Lagoon Wastewater by Constructed Wetlands

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SARE grant $130,325

Animal waste management practices are under scrutiny by the public and by state and federal agencies because of their potential impact on the environment. The public perceives and associates water quality problems of streams and lakes as being caused by irresponsible farming practices. Excessive application of animal manures on crop and pasture lands is generally implicated as a major source of non-point source pollution of streams and lakes. Odors associated with animal manures have hindered expansion and new startups of confined animal operations, especially swine operations. Also, there have been comments associating foodborne disease outbreaks with "insanitary conditions" and improper management and disposal of animal manures on livestock farms. Swine production facilities have been the focus of much criticism in recent years. Odors and the potential for water contamination are cited as problems of such operations. Many swine production facilities employ liquid waste management systems with lagoons as low cost, temporary waste storage structures. The liquid waste must be spread on land periodically to avoid overflow of lagoons, and during land application, manure odors are particularly evident. Alternative liquid animal manure management systems need to be explored which can reduce the impact of the waste on the environment and which permit sustainability of swine and other livestock production enterprises.

Constructed wetlands were first used in Europe and Scandinavia as an affordable alternative to municipal wastewater treatment systems. The technology has been proven to be highly successful for treatment of municipal wastewaters, and this has stimulated interest to apply this technology to the treatment of liquid manures such as liquid swine manure in lagoons. Some of the perceived benefits of using constructed wetlands for the treatment of swine lagoon wastewaters are : 1) low cost of construction, 2) low operation cost, 3) highly efficient process, 4) the process is natural and uses low technology, 5) low mechanization, and 6) good potential for controlling odors. It appears that constructed wetlands are well suited for use on livestock farms for the treatment of large volumes of wastewater at a nominal cost. To demonstrate the use of constructed wetlands for the treatment of swine lagoon wastewater, a project was initiated in Alabama with the following project objectives:

1) Develop guidelines for efficient operation of constructed wetlands for bioremediation of swine lagoon wastewater.

2) Determine impact of wetlands treating swine lagoon wastewater on groundwater quality.

3) Demonstrate efficient swine lagoon wastewater treatment by wetlands to regulatory agencies and to area livestock producers.

Approach

The wetland system was constructed at the Sand Mountain Agricultural Experiment Station at Crossville, Alabama in the late Fall of 1988. The system was designed according to criteria from the Tennessee Valley Authority for constructed wetlands treating municipal wastewater. A one-acre wetland was built with five, 0.1 acre (26 feet wide X 164 feet long) wetland cells in the upper tier and five cells in the lower tier. The total wetland area is 1 acre which treats all the manure from a 500 market hog/year operation. The wetland cells were planted with emergent aquatic plants in the Spring of 1989 with cattail, soft-stem bulrush and common reed as the predominant aquatic plants. The plants were cultivated for two growing seasons before swine lagoon effluent was treated in the wetland cells. Because animal manure lagoon effluents contain high ammonia levels which can be toxic to plants, the lagoon effluent was first diverted through a shallow 0.25 acre mixing pond to allow dilution of the wastewater, if necessary, before the lagoon effluent entered the wetland. Constructed wetlands work best when animal manures are diluted and some particulate matter is removed prior to the wastewater entering the wetland system. This can be accomplished by water flushing the manure out of livestock production facilities into a two-stage lagoon system where some treatment and settling of particulates occur. Effluent from the secondary lagoon can then be treated in wetlands much more efficiently. This type of wet-

land treatment system was monitored at two-week intervals for 57 months at a Biochemical/Biological Oxygen Demand (BOD_5) loading rate of 4 lbs BOD/acre/day. At this loading rate to the wetland system the wetland effluent had less than 10 ppm total ammonia-nitrogen (NH_3+NH_4-N), less than 30 ppm of total suspended solids (TSS) and less than 30 ppm of BOD_5 as recommended by the USDA/Natural Resource Conservation Service (NRCS). There has been no impact on groundwater quality during the wetland study.

Another study conducted at the Crossville, Alabama demonstration site evaluated three BOD_5 loading rates to verify the 4 lbs BOD/acre/day loading rate determined previously was on target or if the wetland loading rate could be increased without impairment of wastewater treatment efficiency. The three BOD_5 loading rates (5.2, 7.1, and 11.7 lbs BOD/acre/day) were monitored for 23 months. At the low loading rate (5.2 lbs BOD/acre/day) the wetland outflow had 14.7 ppm of total ammonia-N, 9.5 ppm BOD_5, and 25.1 ppm of TSS. Both BOD_5 and TSS were within the USDA/NRCS guideline of less than 30 ppm, and total ammonia-N only exceeded the guideline by 4.7 ppm. These results indicate that a wetland loading rate of 4 to 5 lbs BOD_5/acre/day will permit sufficient wastewater treatment to achieve USDA/NRCS suggested wetland effluent guidelines for TSS, BOD and total ammonia-N. At this wetland BOD_5 loading rate about 7,700 gallons of lagoon effluent can be treated daily with a one acre wetland. Mass loading of TKN and BOD_5 into the wetlands was reduced 67.8% and 83.3%, respectively, with 1.8 lbs of TKN and 0.85 lbs of BOD_5 exiting the acre wetland daily. This degree of wastewater treatment may be viewed as unnecessary because the treated wastewater cannot be discharged without a regulatory permit. However, water that is treated to meet wetland effluent discharge criteria of government agencies may be interpreted to be safe to be used to flush manure from swine production facilities. Water treatment to achieve water suitable for use in swine production facilities must eliminate odors and practically eliminate potential hazards from enteric pathogenic bacteria.

Studies at the Crossville, Alabama demonstration site with wetland effluent recycled for use as flush water for cleaning swine farrowing and nursery houses, have demonstrated that recycled water had average TKN, total ammonia, and BOD_5 concentrations of 7.7, 2.2, and 13.8 ppm, respectively, that meet Georgia Department of Natural Resources guidelines for effluent discharge from constructed wetlands treating municipal wastewater. The Georgia guidelines require the effluent to not exceed a BOD_5 of 20 ppm and 5 ppm NH_3-N during May to October which is during the Summer and Fall when wetland treatment efficiency is highest. Treatment of swine lagoon wastewater to these final effluent treatment criteria eliminates odors and substantially reduces levels of nutrients and fecal coliform bacteria. The final effluent can be applied to land or recycled for cleaning swine production facilities, thereby reducing the impact of the lagoon wastewater on the environment and also contributing to the sustainability and profitability of swine production enterprises.

Impact of results

In addition to the potential negative impact of animal manure on water and air quality, there is a growing concern that improper manure management might have a major impact on the dissemination of enteric diseases such as *E.coli* 0157:H7 and *Salmonella* from infected food-producing animals to humans. Studies have shown that *E.coli* 0157:H7 and *Salmonella*, inoculated at over a million bacteria/ml into wastewater collected from various sites in the wetland treatment system, were eliminated in less than 20 days. Lagoons are required to have a minimum of three months storage capacity, wetlands should have at least 12 days detention and the catch basin for the wetland effluent provides additional detention time. The combined water storage time is more than 20 days which has a considerable margin of safety for the elimination of enteric bacterial pathogens. Following treatment of the wastewater through the lagoon/wetland system, the water is safe to apply to land or to use as cleaning water in livestock production facilities.

SARE
Sustainable Agriculture Research and Education
Southern Region

AS95-19
Final Report
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Biological Control Methods for Citrus Rust Mites and Spider Mites on Florida Citrus Utilizing Predaceous Arthropods as Part of IPM

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SARE grant $75,000

Objectives

1.) Determine the seasonal occurrence and distribution of *Agistemus floridanus* (Acari: Stigmaeidae) and other predaceous arthropods within individual trees in seven selected commercial citrus grove sites located in central and south Florida for one year.

2.) Identify important weed (ground cover and vine) plants within the citrus groves that contain *A. floridanus* or other prevalent species of predaceous arthropods during the year. Determine when specific ground cover plants are flowering within each selected grove site. Determine if there is seasonal or vertical movement of predaceous mites or insects between citrus and ground cover vegetation or vines within the groves.

3.) Determine the life table parameters of *A. floridanus* and other selected prevalent predators including developmental rates, reproductive potentials, and number of female progeny produced per adult female in the laboratory when provided with citrus rust mite as the food source.

4.) Determine comparative toxicities of all registered pesticides (including insecticides, miticides, fungicides and herbicides) used in the Florida citrus industry at recommended and reduced field rates against *A. floridanus* populations and one or more other selected prevalent species of predaceous mites or insects based on results from Objective 1.

5.) Establish experimental citrus grove sites with other farmers previously on chemical mite control programs and implement augmentative infestations of selected predaceous arthropod species and ground cover plants (if appropriate) and modify spray programs to minimize toxicity to the selected predators. Continued monitoring of these sites will be completed during years two and three of the project to establish successful biological control of the targeted mite species and fine tune the methods.

Approach

Two important groups of pests on Florida citrus include the rust and spider mites. Sole reliance on chemical control has resulted in significant economic production costs to growers. Florida citrus has a highly diverse complex of phytophagous, predacious, saprophytic and fungivorous mites within the tree canopies and on various cover crop plants. This project identified 29 species of Phytoseiidae, 10 Cheyletidae, 10 Tydeidae, 1 or more Tarsonemidae, 2 Cunaxidae, 4 Ascidae, 1 Histiostomatidae, 2 Macrochelidae, 1 Parasitidae, 3 Laelapidae, 6 Acaridae, 1 Bdellidae, 1 Anystidae, 2 Eupalopsellidae, and 5 predacious thrips species (Insecta: Thysanoptera). Prevalent species of Phytoseiidae from high to low frequencies were: *Euseius mesembrinus* (47%), *Typhlodromalus peregrinus* (33%), *Iphiseiodes quadripilis* (7%), *Typhlodromips dentilis* (3%), *Typhlodromina subtropica* (1%), and *Galendromus helveolus* (<1%). All other phytoseiid species were less than 1% of the total 27,805 slide-mounted specimens identified from subsamples. *Agistemus floridanus* (Stigmaeidae) was the third most abundant predacious mite (2,428 slide-mounted specimens) following the first two phytoseiids. Ground cover plants were identified and 59 of 77 had one or more species of Phytoseiidae present. *Euseius mesembrinus, T. peregrinus, I. quadripilis* and *T. dentilis* were found in abundance on one or more ground plants. Vertical movement of predators was documented. Stigmaeid mites were not recovered from ground cover plants. Herbicide programs of cooperators did not create phytophagous mite problems although stigmaeid/phytoseiid ratio differences were indicated between herbicided and non-herbicided groves. Feeding and life table studies with stigmaeid predators continue. Several phytoseiid mites and two species of stigmaeids (*A. floridanus* [native] and *A. industani* [exotic]) were shown to feed on citrus rust mites.

Pesticides (24) were sprayed in the field in 250 gallons of water per acre using conventional tractor-drawn airblast equipment to compare toxicities against two phytoseiid mites (i.e. *E. mesembrinus* [native] and *E. stipulatus* [exotic]) and two stigmaeid mites (i.e. *A. floridanus* [native] and *A. industani* [exotic]). Pesticides were rated as either highly toxic, toxic or slightly to non-toxic based on their overall effect on gravid females, subsequent egg production and surviving immatures.

Results

Pesticides considered highly toxic to gravid female phytoseiids were: Nexter 75WP at 6.6 oz, Guthion 50WP at 4 lbs, Carzol 92SP at 1 lb, Dicofol 4 EC at 6 pints and Comite 6.55 EC at 3 pints. Toxic pesticides to gravid female phytoseiids were: Nexter 75WP at 5.2 oz, Agri-mek 0.15 EC at 10 oz + 5 gallons petroleum oil, Ferbam 76WP at 15 lbs, and Benlate 50WP at 1.5 lbs + Ferbam 76WP at 5 lbs, Sevin 80S at 10 lbs, Sevin XLR at 2 gallons + 1 gallon petroleum oil, Benlate 50WP at 3 lbs, Ethion 4EC at 6 pints + 5 gallons petroleum oil, and Alert 2SC at 20 oz. Pesticides resulting in significant egg reduction or immatures were: Agri-mek 0.15 EC at 10 oz + 5 gallons petroleum oil, Nexter 75WP at 6.6 oz, petroleum oil at 5 or 10 gallons (reduced immatures of both *Euseius* species), Ferbam 76WP at 15 lbs, Benlate 50WP at 1.5 lbs + Ferbam 76WP at 5 lbs, or Benlate 50WP at 3 lbs (reduction in eggs), and Nexter 75WP at 6.6 oz + 5 gallons petroleum oil (reduced eggs and immatures). For *A. industani,* highly toxic pesticides to gravid females were: Dicofol MF at 6 pints, Fenbutatin-oxide 50WP at 2 lbs, Chlorenapyr 2SC at 0.3 lbs + 5 gallons petroleum oil, Sulfur (Kumulus 80DF) at 15 lbs, Ethion 4EC at 6 pints + 5 gallons petroleum oil, Propargite 6.55 EC at 3 pints, Pyridaben 75WP at 6.7 oz, and Chlorfenapyr 2SC at 0.3 lbs. Highly toxic pesticides that reduced oviposition were:

Propargite 6.55EC at 3 pints, Ethion 4EC at 6 pints + 5 gallons petroleum oil, Ferbam 76WP at 10 lbs, Dicofol MF at 6 pints, Pyridaben 75WP at 6.7 oz, Fenbutatin oxide 50WP at 2 lbs, Benomyl 50WP at 1.5 lbs + Ferbam 76WP at 5 lbs, Sulfur (Kumulus 80DF) at 15 lbs, and petroleum oil at 2.5 gallons. Highly to moderately repellent or irritating pesticides to gravid female *A. industani* were: Trilogy 90EC at gallons, Benomyl 50WP at 2 lbs, Benomyl 50WP at 1.5 lbs + Ferbam 76WP at 5 lbs, and Ferbam 76WP at 10 lbs.

In two completed field evaluations during 1997, all treatments that included copper resulted in significantly higher citrus rust mite and spider mite densities during the growing season. There was significantly greater rind blemish injury from citrus rust mites at one site during 1997. The 1997 tests, indicated that tydeid mites had significant reductions mid to late season at both grove sites while no effects on the phytoseiid mite complex were recorded.

SARE
Sustainable Agriculture Research and Education
Southern Region

AS95-21
Final Report
December 1998

Reduced-Risk Cockroach Control in Confined Animal Production

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SARE grant **$38,840**

Objectives

Swine production is an important component of North Carolina's agricultural economy. Cockroaches have long been recognized as important pests in swine production and severe infestations may contribute significantly to disease maintenance and transmission. However, management of cockroach populations is severely constrained by many factors including: cultural and production practices used at the facility, poor sanitation and building design, as well as frequent re-introduction of cockroaches by workers and suppliers. In addition, regulatory restrictions on the types and classes of pesticides that can be used in such facilities frequently result in overuse of a narrow spectrum of chemicals, increasing the potential for insecticide resistance in the cockroach population.

The overall goal of this project was to document and demonstrate reduced-risk integrated pest management approaches in confined swine production systems. Central to the philosophy of integrated pest management (IPM) is the idea that treatment should be based on need. Yet, current cockroach suppression practices rely heavily upon multiple scheduled applications of broad-spectrum insecticides with little concern about pest population size. This is due primarily to lack of efficient detection and monitoring tools for cockroaches.

Therefore, a major motivation of our research was to study the utility of cockroach pheromones and visual inspections in the implementation of IPM principles in managing cockroaches. We proposed research that would result in the identification of the sex pheromone of the Oriental cockroach.

Laboratory and field studies evaluated the utility of periplanone-B, a component of the pheromone blend, for integrated cockroach management in swine houses. The pheromone was highly effective at detecting infestations and monitoring the level of pest populations. It is also of great utility in tracking the phenology and age-structure of cockroach populations. Concurrently, we evaluated the efficacy of several commercial cockroach attractants and concluded that the pheromone was most effective.

Other specific objectives included identification of available pest management alternatives for broad-spectrum pesticides, developing and evaluating these alternative approaches for integrated pest management, demonstrating their efficacy, and quantifying reduction in risks to animal and human health and the environment. The ultimate goal of this study was to deliver an education program to production managers to allow them to continue an effective site-based pest management strategy.

Results

We showed that a "two-step program" was highly effective. First, a "clean-out" application of a residual insecticide removed the bulk of the cockroach population as well as flies and spiders. To avoid the overuse of pesticides and development of pesticide resistance, the second step involved deployment of reduced-risk bait formulations and boric acid dusts, coupled with physical removal of cockroaches by vacuuming.

Each component of the resulting reduced-risk pest suppression program has been demonstrated on a commercial farm, and we are developing reference and training materials (manuals, interactive computer, videos) on reduced-risk pest control techniques. These will be available to target audiences, including commercial swine producers and county extension personnel.

Impacts

The long-term impacts of this project include the following: Pheromones will reduce insecticide use, increase accessibility to pests that retreat into insecticide-free cracks and crevices, increase the efficacy of insecticides, serve as highly specific agents with negligible mammalian toxicity, permit the viability of reduced-risk biopesticide approaches such as biological control agents, reduce costs, and they will have a direct impact on the quality of worker health, the environment, and swine production. The reduced-risk pest suppression program will likewise result in reduced insecticide usage, cleaner environment, lower cockroach populations, and better the welfare of workers and swine.

SARE
Sustainable Agriculture Research and Education
Southern Region

AS96-25 (LS96-81)
Progress Report
December 1998

Controlling Cheat and Annual Ryegrass in Small Grains Using Novel Crop Harvesting Technologies

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Oklahoma Wheat Growers Asso.

Mark Hodges
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SARE grant $208, 624

Since McCormick first invented his reaper about 150 years ago, the age old drudgery of grain harvesting has slowly yielded to mechanization. After decades of gradual improvements, the grain binders and stationery threshing machines were finally joined together into machines known as "combined reaper-threshers" and later called combines. Modern grain combines rapidly and efficiently harvest and collect grain and return the straw, chaff, and weed seeds to the field. Over the past 75 years, the primary function of grain combines has remained the same. That is, collect the grain crop and return everything else to the field. An advantage of the old grain binder plus stationery thresher harvesting system was that weed seeds were carried off the field with the bound shocks of grain. Our project is designed to regain this advantage by advancing grain harvesting technology to include separate collection of the seeds of weedy grasses, particularly cheat and Italian ryegrass, that now pass through a combine and return to the field.

Objectives

1. Investigate three distinct modifications to conventional grain harvesting procedures designed to either remove cheat and annual ryegrass seed from the field during the wheat harvesting process or devitalize it.

2. Evaluate the new harvesting procedures as a component of an integrated cultural grassy weed control system.

3. Determine the economic feasibility.

4. Disseminate our findings.

During the three harvests (1996, 1997, and 1998) covered by this project, the following engineering related issues were investigated in depth:

1a. Capturing weed seed and other materials at the combine shoe by removing the material from the combine cleaner air stream.

Chaff and weed seed were collected with the Redekop collector. The system was acceptable for collecting and removing all of the discharged weed seed from the field. The principal weakness of the system was the large amount of weed seed deposited into the clean grain stream.

1b. Capturing weed seed and other materials at the combine shoe by reducing combine cleaner air velocity and removing weed seed with the grain.

Essentially all weed seed was captured, however small plant parts and chaff were collected with the clean grain. This nearly doubled the volume of the material to be recleaned.

2. Recleaning the grain.

Two cleaners, an aspirator cleaner and a screen-auger cleaner, were investigated as recleaners on the combine. When cleaning only wheat with cheat, these cleaners were highly efficient. However, the addition of large amounts of chaff, short straws, and wheat heads, that occurred when the combine was operated to capture all weed seed, greatly reduced efficiency.

3. Capturing weed seed for Animal feed.

Bagging and binning have been evaluated. Both methods worked good. Feed values have been determined.

4. Devitalizing weed seed for deposition in the field.

A major objective of this research was to develop a mechanism to mechanically devitalize weed seed. Farmers have stated that they want the flexibility to kill the weed seed and to return it to the field rather than collecting it for feed. Mechanisms investigated were roller mills and hammer mills. Results of this research have been reported in the journal articles included in this report. A hammer mill was chosen because of its relatively high capacity and flexibility. The one horsepower mill could easily process all material removed by the on-combine 3-stage aspirator recleaner.

This work shows that weed seed can be removed while combining, and devitalized or collected for processing as animal feed. Ongoing experiments to be completed in 1999 are designed to quantify agronomic benefits of using this type of equipment.

Professional Development Project Summaries

State Professional Development Program Reports

Each of the following states received an allocation of $10,000 to support training activities. Sustainable agriculture state coordinators from the 1890 and 1862 Land Grants submitted a collaborative training proposal, which was approved by the PDP Leadership Committee. These funds complement ongoing efforts in each state to provide sustainable agriculture professional development opportunities. The information presented below is not all inclusive; for more information on specific projects, contact the project director or PDP coordinator, Roger Crickenberger (919) 515-3252.

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The objectives in our state strategic plan for sustainable agriculture were addressed through the facilitation of three training programs.

The Conflict Resolution Workshop focused on skills in facilitating conflict resolution and mediation. Twenty extension faculty and two employees of the Nature Conservancy completed the workshop. The Workshop on Marketing Strategies included 3 training programs: Livestock Products, Organic Products, and Vegetable Products. Each training addressed an aspect of value-added alternatives for small scale producers. A total of over 75 county extension faculty, producers and farmers attended the workshops. Florida A&M University coordinated hot pepper demonstrations on four local farms in North Florida in 1998 for professional development training programs.

Georgia

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The objectives of the 1997 Georgia Sustainable Agriculture Training Program have been addressed through several training efforts. The web page is under development and two issues of the sustainable agriculture newsletter have been completed and distributed. Two Compost Facility Operator training workshops were held and trained approximately 10 CES Staff, 4 NRCS Staff, 3 farmers, 11 from private industries, and 18 county and city government employees.

A workbook was developed to train farmers and high school students on water quality and nutrient cycling in agricultural systems. An additional 300 copies were printed for distribution to agricultural trainers throughout the state. The workbook was also compressed into a four-hour training course and offered to extension specialists in Georgia.

Georgia Sustainable Agriculture Training Plan of Work for Nutrient Management and Grazing Workshops

Dr. Mark Risse

The Watershed Stewardship Seminar trained over 165 farmers and agricultural professionals in sustainable agricultural practices. They observed the impacts of their practices by taking water quality measurements in agriculturally impacted waters. More than 45 middle and high school students were trained in water quality. Detailed information went home with the participants in the form of a notebook.

The Small Beginning Farmer workshop sessions covered a wide variety of topics including Forestry, Sustainable Agriculture, Marketing, Specialty Crops, Organic Farming, Livestock Enterprises, Advanced Technologies, Farm*A*Syst, Record Keeping and Estate Planning. Over 250 people attended the workshop, and 92 attended the sessions on nutrient cycling and water quality.

Kentucky

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As a result of the AgPlan95, each county has an Agriculture Advancement Council. The needs and programs are aggregated into 15 area and one State Advancement Council. The Ag Advancement Councils meet one to six times per year at the county level and two times per year at the area and local level.

The other part of the KY PDP is critical support for agents or specialists that facilitate learning of integrated farming systems. Examples of the types of continuing education that has been supported include: Beef, Integrated Resource Management, The Kentucky Grazing School, Total Farm Planning, and Implementation of the Kentucky Agriculture Water Quality Plan.

Louisiana

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The Master Gardener program provided training and support for many volunteers who assist in identification of problems and help to reduce the use of unneeded pesticides. County agents in the major agricultural parishes of Louisiana provided training on back siphoning prevention at private pesticide application training as well as several clinics on the proper application of granular fertilizer. Certification programs for both commercial and private applicators trained and recertified 4907 farmers, sales personnel, agents, homeowners and professionals.

Other programs included compost training, cotton, IPM, and programs with the youth through 4-H. Seventeen educational meetings were conducted on the technical aspects of boll weevil eradication. Field agents continue to support the programs with field days, tours, training sessions and newsletters.

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Quarterly meetings and training sessions have been held for the state sustainable agriculture committee to develop concepts on sustainable agriculture.

A display illustrating several of the concepts of sustainable agriculture has been developed to aid in teaching sustainable agriculture at field days across the state, reaching about 500 farmers and agri-business representatives.

In-service training has been held for over 30 extension and other agency personnel. The training covered strategic farm planning, IPM, pesticide management, conservation of natural resources including forestry, community service, and conservation tillage. Training for county extension agents resulted in two county meetings on sustainable agriculture with 130 clientele attending.

North Carolina

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The Sustainable Agriculture Interest Group met in June and July to develop a new State Strategic Plan. Objectives were developed that addressed the following topics: 1) mission and vision statements; 2) training of agricultural professionals; 3) sustainable agriculture curricula; 4; sustainable agriculture institute/reward program; 5) Center for Environmental Farming Systems; 6) farmer initiated research; 7) evaluation; and 8) outreach and publicity.

During 1998 PDP program support funds were used to: 1:) Support farmer involvement in strategic planning activities by funding travel and providing a small honorarium. 2.)Sponsored a luncheon program during the annual new agent workshop where new agents were introduced to sustainable agriculture concepts and resources. 3.) Supported travel and registration for NCCES agents to attend Regional PDP workshops, Sustainable Agriculture Conference Sponsored by the Carolina Farm Stewardship Association, and six Pasture Ecology and Rotational Grazing Management Schools. Educational resources for NCCES agents including two SAN publications, Steel in the Field and Managing Cover Crops were distributed to field faculty as resource materials.

Puerto Rico

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A workshop in Sustainable Agriculture was conducted for 25 farmers and 5 extension agents and covered four topics: soil fertility, soil and water conservation, agroforestry, and IPM. The sessions included "hands-on" activities such as composting, legume trees planting, use of green manures, and vegetative barriers for soil erosion.

A 4-H Camp was held for forty-four youngsters where they learned principles of SA and alternative sustainable practices for starchy crops production. Three extension personnel participated in an Alternative Sustainable Practices in Dairy Production course. Two meetings were held for the discussion of Community Supported Agriculture. The 28 participants, mostly leaders in the farming community, exchanged ideas on how to adapt the model to the Puerto Rican situation and conditions.

South Carolina

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The beef cattle production program, which started in September 1997, has five components: cow-calf production, replacement heifer development, preconditioning, backgrounding/stockering and retained ownership. There have been several beef cattle production and agronomic-beef demonstrations. Three field days have been held at the Sustainable Ag Production Systems Center, with 309 total participants including 48 agents, 15 professionals and 246 farmers.

Two reports were prepared and 240 copies have been distributed to extension agents and specialists, ag professionals and producers. Forty-six web pages have been created and published at the Sustainable Ag Production Systems Center. More web pages will be added as information becomes available.

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Training was provided to over 1,200 extension agents, producers, other federal and state agency personnel and agriculture professionals during 1997-98. Training focused on chemical use, forages, systems approach, alternative marketing and sustainable demonstration farms. Five on-farm training sessions were conducted where a case study of the integration of production, management and marketing on a whole-farm approach was used.

Teaching aids are being developed for cow-calf, soybean and cotton producers. Emphasis will continue on forages, their potential impact on the cattle and dairy industries and value to soil and water quality. Livestock waste management will be a priority in 1999. Training will be required to assist producers in implementing nutrient management plans.

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County agents in five of the twelve districts have received training on the fundamentals of sustainable agriculture. This consisted of a two-hour program, including: a written survey of their knowledge and attitudes about sustainable agriculture, an explanation of the definitions of sustainable agriculture, an introduction to resources about sustainable agriculture, and a presentation of a video made in Texas.

At a West Texas range improvement training, 12 new county agents learned about subjects such as range plants, watershed management, ecosystem concepts, and integrated brush system management. A meeting, Developing East Texas Sustainable Agriculture Systems for the 21st Century, was attended by over 50 professionals from Extension, NRCS, NGOs and production agriculture.

Virginia

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One hundred thirty-five vocational agriculture teachers were trained in alternative agriculture and several groups in the general public toured VSU's Research Farms. Workshops on sustainable agriculture and a field day on crop diversification were attended by FSA, NRCS, and extension professionals.

Faculty members conducted demonstrations in production of certified organic soybeans, seedless watermelon, and cut-flowers. Research was conducted in production and marketing of sweet sorghum cane, cut-flowers, garlic, natural beef and organically grown vegetables for the Clinch Powell Sustainable Development Initiatives. Sixty farmers were involved in this project.

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Twenty-two agricultural professionals from several VI organizations participated in a 2 ½-day workshop on basic composting technology. Research specialists, administrators, and farmers from UVI and the University of Puerto Rico participated in a 2 ½-day information exchange seminar and tour.

An on-farm research project provided an opportunity for local farmers to observe how basil responds to organic and synthetic mulch under drip irrigation. It was led by the two farmers who cooperated in the research project and attended by six other farmers. A seminar entitled "Improving Culinary Herb Production in the Virgin Islands" was held. This forum provided the cooperating farmers a chance to discuss the herb research results and share their individual experiences with the community.

North Carolina State Sustainable Agriculture Plan of Work 1998, NCSU Crop Science, Paul Mueller

Mississippi Sustainable Agriculture Training Plan of Work 1998, Mississippi State University, Malcolm Broome

Texas Sustainable Agriculture Training Plan of Work 1998, Texas Ag Extension Service, Charles Stichler

Louisiana Sustainable Agriculture Training Plan of Work 1998, LSU Ag. Center/LA CES. Dale Pollet

Kentucky Sustainable Agriculture Training Plan of Work 1998, Kentucky Ag Advancement Council, Larry Jeffries

Virginia Sustainable Agriculture Training Plan of Work 1998, VA Tech/VA CES, James Pease

Oklahoma Sustainable Agriculture Training Plan of Work 1998. OK State University, Ross Love

Florida Sustainable Agriculture Training Plan of Work 1998, University of Florida, M.E. Swisher

Georgia Sustainable Agriculture Training Plan of Work 1998. University of Georgia, Mark Risse

Puerto Rico Sustainable Agriculture Training Plan of Work 1998, PR Ag. Extension Service, Luis Mejia-Maymi

Tennessee Sustainable Agriculture Training Plan of Work 1998, University of Tennessee, Ray Humberd

South Carolina Sustainable Agriculture Training Plan of Work 1998, SCSU, Fred Broughton

Arkansas Sustainable Agriculture Training Plan of Work 1998, University of Arkansas CES, Tom Riley, Jr.

SARE
Sustainable Agriculture Research and Education
Southern Region

Regional Project
Progress Report
December 1998

Southern Region SARE Professional Development Program Soil Nutrient Management Project

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SARE grant: **$75,000**

An essential component of the SARE PDP is teaching-learning partnerships among researchers, educators, farmers, and agricultural stakeholders in the development of multi-state and regional educational programs. This regional project is a training program that brings southern region states/territories together to address common issues related to soil health and fertility management. The project will explore alternative ways of looking at soil and fertility management and introduce principles of maintaining appropriate levels of organic matter, soil nutrient balance, and biological life. The objective of the project is for participants to develop skills in problem solving using a whole-farm, systems approach.

The project planning committee brought together a collaboration of farmer, agency, and NGO representatives from southern region states. The committee developed curriculum guidelines for the train-the-trainer workshop. The curriculum emphasizes whole farm systems, soil as a regenerative productive resource, experiential learning, problem-solving techniques, and program evaluation.

As a result of the discussion process, four subject areas were identified: 1) foundation principles—goals and values relating to sustainability and stewardship; 2); soil content and characteristics—soil organic matter, tillage, crop productivity, practices; 3) moving principles to practice—nutrient management, organic soil amendments, chemical and mechanical management; and 4) educational methods—evaluation techniques, farmer/institutional networks.

The next phase of the project involves development of the train-the-trainer workshop based on the curriculum recommendations identified at the planning meeting. Five representatives from each state and territory will be invited to attend the workshop.

Objectives

1) To model and teach an integrative approach to problem-solving and trouble-shooting.

2) To offer substantive, realistic, useful, examples of successful sustainable agriculture production systems (large scale, small scale, and scale neutral) focused on soil and fertility management for educational programs used by extension agents working with producers, consumers, lenders and other stakeholders.

3) To develop agent skills in observing long term soil nutrient and fertility issues, troubleshooting among alternative solutions in a systems approach, and documenting accomplishments, impacts and outcomes.

4) To build and disseminate an information base for reporting and marketing purposes of successful approaches to nutrient management and success stories of sustainable agriculture practitioners in southern region agriculture.

SARE
Sustainable Agriculture Research and Education
Southern Region

LST96-9
Final Report
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Management Intensive Grazing: Foundation of Sustainable Agriculture in the South

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SARE grant $ 97,223

Objectives

The objectives of this project were to provide comprehensive management intensive grazing (MIG) to national Cooperative Extension Service (NCES), Natural Resource Conservation Service (NRCS) personnel, and innovative livestock producers stationed in the humid, temperate and subtropical Gulf South through a training project.

The specific goals were to: (1) Demonstrate via lectures and hands-on field training the economic, environmental, and agricultural benefits of MIG compared with conventional agriculture. (2) Illustrate the role of MIG in comprehensive sustainable agriculture planning. (3) Train participants to assess farm suitability (soils, pastures, buildings, equipment) for MIG. (4) Train participants how to teach field management to other farmers. (5) Develop and distribute fact sheets on MIG in the South for use by participants and clientele. (6) Development and distribute training videos that will supplement participant knowledge of MIG systems.

Approach

The concept of Management Intensive Grazing is needed in the South to efficiently utilize the abundant forage biomass produced annually. The method of educating the trainers should have been more interactive from the "grassroots". If producers had demanded the extension service provide this type training, the county agents would have gotten their educational information. However, it seemed that producers were willing to bypass the extension service and use the agency (NRCS) that was willing to accept a more sustainable production approach.

A viable approach is currently being conducted in Virginia with pasture clubs and interactive training being conducted in grazing management.

Invitations were extended to NRCS and extension state offices in the 13 southern states. Announcements were published in regional and national publications and invitations were extended directly to NRCS and Extension Service personnel.

Since each state now has a sustainable agriculture advisory committee, more emphasis is being placed on educational training in this area. The extension service in the southern region has only sent token representation to participate in this particular education training endeavor. Most of the participants involved in one of these previous workshops indicated a desire for additional training in MIG. To accommodate those requests the advanced workshop was conducted in May 1996. All former participants were invited to return to this advanced workshop.

Methods

Workshops were conducted in April, May and September of 1994, 1995, 1996 and 1997 to train participants in management intensive grazing (MIG). Participants included producers and Natural Resource Conservation Service personnel from Louisiana, Arkansas, Mississippi, Texas, Georgia, Oklahoma and Alabama and ten Cooperative Extension Service County Agents from Louisiana with one each from Kentucky and Florida. The workshops were conducted for three days with both classroom and field sessions.

The itinerary included:

<u>Oral presentations in the classroom</u>

- The science and art of grazing man agement
- Environmental management
- Plant growth basics: energy flows, nutrient cycling, fundamentals of growth
- Understanding soils and the land scape
- Resources of the farm
- Economics of management inten sive grazing
- Forage quality, animal require ments, and intake
- Meeting nutritional needs of live stock
- Matching livestock and forage re sources
- Forage system strategies for year-round nutrition
- Controlled rotation grazing: putting it all together
- MIG on my farm
- Grazing Land Applications and nutrition balance

Field demonstrations with hands-on experiences

- Participant groups grazing demonstration
- Biodiversity
- Water systems
- Keeping pasture records
- Forage quality
- Field pasture assessment
- Forage harvest efficiency
- Fencing equipment
- Forages for year-round grazing
- Soils in the field
- Quantity measurement and species identification
- Forage management practical applications

Workshops were conducted in early spring on cool-season annual forages and in summer and fall on warm-season perennial forage. Information fact sheets in support of grazing management were written and included in a notebook for all participants.

Fact sheets:

"The role of ruminant animals in sustainable agriculture"-Alan DeRamus

"The forage growth and its relationship to grazing management"-Alan DeRamus

"Four Factors in the Application of Management Intensive Grazing (MIG) or Controlled Rotation Grazing" - Alan DeRamus

"Understanding soils and landscapes"-Lee Burras

"Estimating forage yield"-Matthew Mattox

"Grazing dynamics of beef cattle"-Jenny Hafley

"Resource Inventories and Evaluations for Planning Purposes" - Dan Caudle

"Proper grazing use"-Dennis Thompson

"Fringe benefits of rotational grazing"-R.L. Dalrymple

"Economics of management intensive grazing"-Leon Labbe

"Forage management practical applications" -R.L. Dalrymple

"No substitute for good management" - J.D. Roussell

"Determining winter pasture stocking rates"-R.L. Dalrymple

Video

A video on MIG is currently being produced. The funding from this grant was not sufficient to complete the exhaustive training video in grazing management. The video is being completed with funding from other sources and will be available to SARE. This video should be beneficial to trainers as well as producers interested in MIG practices.

Impacts and Contributions

Preliminary results of the workshops held have indicated a definite need for additional educational training of agency personnel in sustainable methods of livestock grazing management. Training programs in sustainable agriculture have not been readily available in the South. The concept of "Management Intensive Grazing" (MIG) as a program for livestock producers has had some misconceptions.

Pre-workshop and post-workshop surveys have been conducted to determine the participants' perception of the importance of numerous topics that affect livestock production. The participants ranked the constraints against setting up intensive grazing management systems. Personal management expertise of livestock and forages and knowledge of fencing systems have been ranked as the most important constraints against implementing MIG.

SARE
Sustainable Agriculture Research and Education
Southern Region

LST96-10
Progress Report
December 1998

Sustainable Small-Scale Agricultural Development Training Project

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SARE grant **$25,701**

Objectives

Train professional agricultural educators, community developers and organizational leaders with responsibilities for working with and directing small-scale farmers to:

1.) Become aware of and understand the appropriate use of the various small-scale sustainable agricultural models that are based on holistic approaches (production, management, and marketing).

2.) Acquire the necessary skills to work with grassroots groups, by using sustainable, holistic planning and management models that include, leadership development, strategic planning and evaluation, and communication and group decision making.

Approach

The Southern University Cooperative Extension Program and College of Agriculture, and Heifer Project International (HPI) sponsored two workshops for agricultural professionals who work in the small-scale agricultural sector. The first workshop (2 ½ days), held at the HPI's International Livestock Center in Perryville, Arkansas, focused on leadership development, understanding and applying sustainable development and strategic planning concepts and practices to small-scale and alternative agriculture. Forty-eight participants from eleven states in the Southern Region were present. Additionally, approximately sixty farmers, ranchers, processors and agricultural business persons attended a one-day training meeting held with the workshop.

The second workshop (2 ½ days), held at Southern University, Baton Rouge, LA, focused on marketing, laws and regulations affecting alternative enterprises, and successful small farm sustainable production and marketing practices. The workshop ended with tours of the University's farm and three diversified small farmers' operations. More than eighty individuals from twelve states in the Southern Region to include the U.S. Virgin Islands attended the workshop. Results from the two workshops were reported in the 1997 annual report, thus, this report will focus on the follow-up evaluation and dissemination of information.

We conducted a follow-up evaluation during 1998 to learn how participants viewed the value of the information presented at the workshops, six months later, as they go about doing their work. The evaluation was also designed to detect challenges to sustainable agriculture development and training needs.

A questionnaire was designed and mailed out to approximately eighty participants who attended one or both of the workshops. From the mail-out, twenty-five questionnaires were returned. An additional thirty questionnaires were completed through telephone interviews. A graduate student in public administration was hired to conduct interviews and analyze data.

Results

Survey results indicated that most respondents were still working with small-scale farmers. Their understanding of the multi-dimensions of sustainable agriculture was felt to have improved because of participating in the workshop(s). There was general agreement among respondents that there is improvement in the attitudes of extension agents, NRCS personnel and other professional agricultural workers about sustainable agriculture. Most respondents noted that we have not reached the desired level of acceptance, but there is positive movement.

A goal was for workshop participants to use the information gained and go back into their work environments and form teams of sustainable educators. More than 70 percent of respondents reported being a part of a local or state sustainable network. Many were participating, in varying degrees, with state extension sustainable advisory committees or training teams.

Developing marketing niches and exploring cooperative marketing opportunities were viewed as having the greatest value/need. Respondents rated the area on laws and regulations affecting small farmers as the second highest need. Though, they gave high ratings to this area, it was generally felt to be the area they could least influence through educational programs. Farm tours that showed practical "on the ground" sustainable small farm projects were felt to have value.

SARE
Sustainable Agriculture Research and Education
Southern Region

LST96-11
Progress Report
December 1998

Southern Gathering on Agricultural Problem Solving

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SARE grant **$52,000**

Objectives

1.) Involve extension professionals, other farm service institutions, public media and farm families in the collaborative development and delivery of curricula on issues deliberation, strategic planning and conflict management.

2.) Foster collaboration between educational institutions, extension educators and extension clientele in delivering materials and concepts to workshop participants;

3.) Cooperate with Kentucky Leadership for Agricultural and Environmental sustainability Project, the University of Kentucky Agriculture 2000 and the National Issues Forum initiative of the Kettering Foundation to achieve synergism between development programs.

4.)Cooperate with partners in publicity of project activities.

5.) Solicit balanced participation by diverse farm community sectors, with attention to gender, race, farm related income, disability and other relevant demographic characteristics.

6.) Develop participant ability to apply methods of problem-solving to agricultural and broader rural community issues.

7.) Include hands-on learning activities in curriculum development (i.e., role playing, stimulations, and creation of action plans to be implemented in home communities of participants).

8.) Bring the capacity of agricultural and rural leaders to bring about change through the application of workshop knowledge and skills.

9.) Evaluate workshop efforts focusing on changes in knowledge, opinions, skills and aspirations. Include a wide range of people in the evaluation of the project.

Approach

The goal of the Southern Gatherings on Agricultural Problem-Solving is to build community capacity to recognize and manage change. Rural agricultural communities face many pressures: to increase farm profitability, reduce environmental impact of production, respond to changes in markets and farm policy and to manage development. As individuals chose their own responses to these pressures, the outcome may be a weakening of the community as a whole. The Southern Gatherings on Agricultural Problem-Solving is designed to build the capacity of rural and agricultural leaders with skills and knowledge to: convene groups; talk about divisive issues; resolve conflicts; make choices and design and implement strategic plans. The fundamental assumption of this project is that communities who can go through these processes together will make decisions and take actions that address the fundamental interests of all community members. Although there are some issues that may seem irreconcilable, there are many opportunities for common ground that are often overlooked. Communities do not need to be divided along lines of agriculture, environment or economy. Participants can use these process to find and define the common ground.

Progress of the project to date has included two 'Southern Gatherings on Agricultural Problem-Solving' that were held at the University of Kentucky Rural Development Center in Somerset, Kentucky. The first took place on October 9-11, 1997. It included 125 participants and presenters, mostly from Kentucky and adjacent states. The second was held November 5-7, 1998; 54 participants were involved.

Each of the annual gatherings include three learning tracks: 1) public issues deliberation; 2) conflict resolution; and 3) strategic planning. Farmers, Extension agents, community leaders and other choose one of these three tracks. Plenary sessions draw common themes and lessons from each of these problem-solving approaches. The plenaries also suggest ways for participants to apply their skills in their home communities.

Significant outcomes of this project have been the development of in-state capacity to train participants and trainers in the three skills areas and to apply those skills to county projects and trainings. It has also led to other spin-off workshops throughout the region, particularly in the area of conflict resolution. Three conflict resolution workshops were held for elected officials during the Spring and Fall of 1998. Public conflict resolution workshops were also held in Florida and Arkansas for extension agents and extension lay leaders.

SARE
Sustainable Agriculture Research and Education
Southern Region

LST96-12
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Facilitating Farmer to Farmer Networks: An Experimental Approach

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SARE grant $80,997

Objectives

This joint University of Florida and Florida A&M University project explored alternative approaches that extension can use in facilitating the development of small farmer networks. Recently formed local small farm networks participated in an 18-month program of activities. Activities included an initial workshop to share experiences with farmer networks from the Southern Region, training in basic concepts of sustainable agriculture and group processes, local network activities based on need and interest, a state-wide conference and trade show, and a participatory self-evaluation process in which representatives of local groups come together to share experiences, solve problems, and analyze activities. The principal faculty involved in the project will develop a handbook based on the network experiences for distribution in the South.

Approach

Farmer- to- farmer exchange is critical to building sustainable agricultural systems. This project has thus far worked with several local farmer groups in North and Central Florida where most of Florida's small farms are located. County faculty have been responsible for finding farmers and existing farmer groups that exhibit characteristics emphasizing sustainable agriculture, small farm membership, willingness to work with extension, significant potential for growth, and commitment to facilitating successful group processes.

County faculty submitted proposals to facilitate farmer networks. The project investigator and farmer- to- farmer network approved the proposals that 1) fit with program goals, 2) had processes to achieve these goals, and 3) requested feasible budgets. The majority of proposals focused on increasing market share for small farms based on alternative approaches to marketing farm products. These approaches include developing marketing associations, direct marketing and contract growing of specialty crops, increasing marketability of meat products through producer and consumer education, formation of groups such as the Southern Commercial Rabbit Producer's Association, value-added production, and establishment of retail farmers' markets.

All projects have begun and many are completed. Some of the projects were started in Spring 1998. We attribute this late start to lack of communication and understanding between investigators and county agents and to the fact that the extension approach used is new to both extension faculty and farmers. We presented four workshops in four different counties in North Florida to announce the farmer-to- farmer project to local farming communities. We also held the workshops to respond to farmers' requests to learn more about alternative methods of marketing and production.

Workshops and Conferences

Three separate goat associations: Florida Dairy Goat, Florida Meat Goat and Florida Pygmy Goat Associations competed for similar resources and had common interests. The associations needed to pull together for their own benefits and to better educate the public. The Goat Associations combined efforts with extension to provide information on production, health, processing, and marketing to producers, consumers, industry and government leaders. Members of this group attended the 20th Annual Goat Production Conference at the University of Florida in June 1998. An estimated 125 people attended this conference.

The Southern Commercial Rabbit Producers Association held a conference in May 1998 which was intended for grower to grower information exchange. Approximately 90 persons attended. Turn out to the workshops exceeded expectations. This signaled the desire of local farmers to explore farmer- to- farmer networking as a means of strengthening marketing methods. In addition to these conferences, other farmer-participants currently working in the farmer- to- farmer project made presentations at several other workshops.

The Farmer-to-Farmer Network organized a Small Farm Conference and Trade Show (SFCTS) to help bring small farmers of all types under one roof to discuss issues important to them. The first annual SFCTS took place on October 24, 1998. Forty-five vendors and organizations participated in the trade show and more than 400 persons attended. News coverage in local papers is one outcome.

The Suwanee Valley Field and Greenhouse Growers Short Course and Trade Show is scheduled for January 1999. The meeting will include a wide range of topics including production methods for vegetables, fruits, cut flowers and herbs. Farmers and extension agents will discuss alternative production and marketing practices.

The network continued its education through two state professional development opportunities in 1998. One workshop, January 29, 1998, focused on marketing small livestock operations. Forty-nine producers attended the workshop to discuss ways to improve their operations' marketability. All participants received a 100-page compilation of USDA and Florida State Food Safety and Inspection Service Directives. The vegetable products focused on marketing and valued added alternatives. Eight farmers and thirteen agricultural educators discussed ways farmers and groups of farmers can achieve higher intrinsic value for their product for which consumers will pay more.

The workshops and conferences have brought together people with similar interests and allowed them to share innovative ideas and to discuss problems and situations of importance to them. The meetings promote dialogue among farmers and between farmers and experts. The SFCTS was successful because it brought together small farmers of all types to discuss their diverse activities and offered a forum for small farmers to see the available support systems and create support networks. The participation of county and state county extension faculty and government representatives at the conference allowed the farmers to express their true questions and needs to people who may seem removed from farm operations. The dialogue through panel discussions and informal conversation improved the county and state extension faculty's and government representatives' understanding of the small farmer's needs.

Demonstrations and Outreach

Many projects were conducted at the Institute of Food and Agricultural Sciences Research and Education Center in Live Oak, Florida. They were strictly demonstration because the Center is largely viewed as a small farm research and education center with high visibility and frequent visits from farmers. The demonstrations at the Center included seven areas: cut flowers in greenhouse and in field,alternative strawberry production systems, cole crop production for extending the winter season, herb and leafy green vegetable production, appropriate technology for early muskmelon production in Florida, specialty pepper and eggplant production for small farms in North Florida, and sweet onion production.

We initiated the projects to bring groups of farmers interested in specific topics to the Center to share available information and technology to improve their farm profitability. Specific informal grower groups that have interacted with these demonstrations include the following: 1) a group of young farmers, traditionally dependent upon tobacco as their primary crop, interested in expanding specifically into cantaloupe production for the early market in North Florida and 2) a group of hydroponic greenhouse growers interested in alternative crops comparable to traditional crops like tomato and cucumber; 3) farmers interested in providing fresh produce to area Wal-Mart Superstores; 4) the cut flower industry including growers and potential growers, local retail florists, and wholesale cut flower brokers in Jacksonville. The cut flower project included the demonstration of cut flowers production to small farmers and also included a test market evaluation of those products in both the wholesale and the retail florist market. Sixteen University of Florida county extension faculty were involved in the training and implementation of these groups' activities.

A county small-scale farmers' association developed a "Small Farm Association Producers and Buyers Guide" as a marketing tool in one county where small farms of all kinds could list their commodities. The listings have gone from 50 in the first edition to more than 75 in January of 1998. There have been more than 1500 copies distributed throughout the county. Many consumers use this publication as a directory for locating and purchasing locally produced vegetables, citrus and livestock. Also, many farmers use this publication to set up networking and bartering agreements with other interested producers.

Farmers trained through farmer- to-farmer activities helped establish a cattle marketing advisory committee among cattle producers in eight Northeast Florida counties. The committee works to add value to their cattle through the adoption of recommended health and production management practices and improves their awareness, knowledge and adoption of cattle marketing opportunities and coordinates a series of producer workshops. More than 100 producers attended the cattle marketing educational workshops. Thirty-eight percent of the producers indicated that they would change at least one production management and/or marketing strategy. A data base created with the committee provides cattle numbers, management practices and marketing practices from participants in all eight counties. The group developed cattle marketing alternatives, an opportunities exhibit and a cattle marketing alternative opportunities resource information booklet. The committee also promoted a local livestock auction market for value added sales.

Hillsborough County with the farmer- to- farmer network is completing a study to determine if there is sufficient interest in establishing a new Wholesale/Retail Farmer's Market. The objective of the survey is to improve the economic sustainability of local farmers through increasing the marketing alternatives available to them.

The local project coordinator will send surveys to 1500 agriculturalists and 1000 consumers. The objective of the survey is to determine the need for and direction of the project before it is implemented.

Farmers have come together to share ideas with other people who face similar challenges and problems and to meet with experts for education through the farmer- to- farmer network projects. Farmers participating in the network have had the opportunity to learn about different aspects of their commodities from production and marketing, educate the public about these issues and cooperate to promote their farms and businesses. They have also had the opportunity to express to extension and government agents their special needs.

SARE
Sustainable Agriculture Research and Education
Southern Region

LST96-13
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Sustainable Agricultural Marketing Through Collaborative Policy Development

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SARE grant $40,900

Objectives

1.) Participants will design cost effective agricultural value-added marketing options tailored to their state and a policy education/research process to refine and implement the options.

2.) A hands-on manual based on these methods and tailored to local policy education/research on diversification/value-added marketing will be created and field-tested in multiple states including Kentucky, Tennessee and Arkansas.

Creation of sustainable marketing alternatives is an extremely important research and education topic, but extremely difficult to approach by traditional methods. However, policy change in some states has been successful in helping farmers create such alternatives. This project applied a method successful in creating consensus on environmental issues to provide training and information about policy alternatives in agricultural marketing. The key to this process is first, uncovering the basic assumptions which enable people to be absolutely convinced they are right no matter what the evidence, and then, establishing even more basic stabilizing assumptions which can be agreed to by both polarized groups. Then both previously polarized groups can participate in synthesizing a new approach on this common foundation. This project featured the application of this process to issues of sustainable rural development in three states.

Approach

A series of workshops were held which successfully recruited prominent local businessmen, farmers, USDA staff, legislators and others to work on policy change in diversification/value-added marketing. The project has also assisted specific enterprises which have joined the effort, including community enterprises based on organic cotton, high oil corn, biocontrol, organic poultry, meadowfoam and kenaf. The first event was a workshop in Memphis attended by policy makers and farmers from Arkansas, Missouri, Tennessee and Kentucky. At this workshop, participants learned of the progress of a Minnesota non-profit and a North Dakota Commission established by their respective legislatures. In addition, each state exchanged information regarding their progress and thinking regarding sustainable value-added agriculture.

Out of this workshop came follow-up meetings throughout the Delta These meetings were attended by legislators, farmers and businessmen. At several of these meetings farmers on the boards of the North Dakota and Minnesota efforts participated

The project brought people together from three states to exchange ideas about creation of value-added enterprises. Many of the participants had never before met one another, but have now already designed and even implemented policy change in their states.

As these workshops built on each other, a manual for collaborative policy development was refined, published and is being distributed by the Kentucky Department of Agriculture. An eight page summary was distributed throughout Arkansas, Tennessee and Kentucky and to many locations outside the three states targeted by the project. Copies of the manual are available free of charge from Bill Burnette, Kentucky Department of Agriculture, Room 701, Capitol Plaza Tower, 500 Mero Street, Frankfort, Kentucky, 40601.

As the project proceeded, however, we recognized the growing utility and cost-savings of internet based dissemination of results. Therefore we established a web site and results of the project are now available to anyone with access to a computer and modem. The address of our web site is www.deltanetwork.org.

Results

Four key results were achieved during the project. These include:

1. establishment of the Delta Enterprise Network—dedicated to uniting and assisting community-oriented, environmentally-conscious entrepreneurs in development of locally-owned, value-added enterprises;

2. state legislation and policy networks—education of state legislators about successful programs for sustainable rural development led to ground-breaking legislation in Kentucky and Missouri and progress through state networks in Arkansas and Tennessee.

3. assistance to new enterprises—cooperative efforts to launch sustainable enterprises have been assisted in incorporating, feasibility analysis, business plan development and obtaining facilities and markets.

4. creation of a national network to promote systems facilitation training—beginning with a pilot project for agricultural professionals in the northern portion of the Delta

DEN members have used their training to undertake a major initiative involving all three states as well as others states in the Delta. This initiative focuses on enlisting agricultural research institutions in the cause of Delta rural development. A number of excellent agricultural research facilities exist in the Delta, but none of them have been involved in rural development. The research projects of these facilities' scientists are chosen based on relevance to agricultural production not rural development. The three major USDA/ARS labs in the region have now joined with DEN to implement research programs focused on the need for value-added diversification in the Delta. Key scientists recruited to DEN are: Dr. Neil Rutger of the USDA national rice laboratory, Dr. Harry Dupree of the USDA national aquaculture lab, and Dr. John Robinson of the University of Arkansas Rice Research Center. DEN members designed a project which has obtained bipartisan support nationally. Activities are continuing to build toward a regional network to combine the rural development expertise of the non-profit sector with the research expertise of government labs.

We have become convinced that creation of new cooperative, value-added enterprises and public policy change on a variety of agricultural and environmental issues, will occur much faster if we can multiply the systems facilitation skills which have worked for us.

To accomplish that end, we have begun forming a network of agricultural professionals in the Northern Delta to begin developing agents systems facilitation skills. USDA/Rural Development, Extension Service, and USDA/NRCS staff in the Delta regions of Missouri, Illinois, Kentucky, Tennessee and Arkansas have all signed on.

The final network created as a result of the project is the beginnings of a national network to explore systems facilitation. We have created this network to support our efforts in the Delta to develop systems facilitation skills. The group began to coalesce at the Agriculture and Human Values meetings and has established an email expansion list to explore one basic question: What skills are needed to help facilitate groups efforts to improve their agricultural systems? The email discussion explored basic components of systems facilitation such as: learning systems, social motivation, conceptual pluralism, team-building, nonverbal communication, case studies of innovation and feasibility analysis.

Participants in this network, in addition to participants from the region, included:

Barbara Meister, consultant to USDA and various foundations

Randy Williams, Director of Economic Development, Extension Service, USDA, Washington, D.C.

Sam Alessi, USDA, ARS, Morris, Minnesota

Greg McIsaac, Univ Illinois, Dept of Agronomy

Mick Mayhew, Iowa State, Department of Psychology

Barbara Rusmore, Artemisia Institute

Ray Williams, Oregon State University

Dan McGrath, county agent, Willamette valley, Oregon

Cornelia Flora, Iowa State and North Central Rural Development Center.

The conclusions of this informal working group are being combined with the regional policy effort. The hope is that this effort or some similar effort in another region will lead to a regional or national center for systems facilitation. Ideally, this center would train agricultural professionals and others in the skills needed for facilitation of groups focused on a variety of sustainable policy, economic and environmental efforts.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-15
Progress Report
December 1998

Kentucky Cooperative Extension System Training Project

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SARE grant $50,000

Objectives

1. To educate 1862 and 1890 extension professionals and paraprofessionals about sustainable agriculture.

2.) To educate 1862 and 1890 extension professionals and paraprofessionals about practical uses of organic agriculture.

3.) To educate farmer leaders (members of the Kentucky Agricultural Advancement Council and Area Agricultural Advancement Councils), NRCS and agency employees and farmers about sustainable agriculture and organic agriculture and the need for leaders to share this information throughout their local communities.

The Kentucky Cooperative Extension System Training Project has successfully developed multidisciplinary teams of farmers, 1890 and 1862 Extension and Research professionals and paraprofessionals, NRCS and other USDA agency professionals and technicians, Kentucky Department of Agriculture and other state agency staff, Heifer Project, Intl., agribusinessmen, consumer advocates and veterinarians to address sustainable agriculture issues in Kentucky. Nearly 85 people regularly attend the monthly mini-field day training sessions with over 400 attending throughout the year. Many participants commute for three to four hours to attend.

Marketing and economics topics have included direct marketing, livestock and grain marketing, farm planning and farm records, certified kitchens, alternative marketing methods, advertising, consumer marketing, and consumer awareness issues. Organic, alternative, and traditional methods of sustainable production of grain, tobacco, vegetables, fruits and nuts, livestock, poultry, aquaculture, bees, ostriches and alternative animals, forages, herbs and beneficial insects have been studied.

Production issues have included water quality, cover crops, soil quality and tilth, and environmentally friendly agricultural production. Socioeconomic issues have included the special needs of small, minority and/or limited-resource farmers, as well as, the social and economic needs of farm families and family farm sustainability in a local, regional and global economy.

Over 400 people attended the statewide Stewardship Farming Field Day held on September 18, 1997. Funded through this project and hosted by Kentucky State University Land Grant Program with the University of Kentucky Cooperative Extension Service assisting with the event, it was held in conjunction with a statewide Small and Minority Farmers Conference. Nearly 50 sustainable agriculture topics were presented with the keynote speaker focusing on unheated greenhouse vegetable production and organic horticulture production.

The sustainable agriculture training is already showing impacts across Kentucky. Several outcomes of the project are summarized below.

- Extension Agents and Small Farm Extension paraprofessionals indicate an increased knowledge of sustainable agriculture and sustainable production techniques.

- The sustainable agriculture training sessions have included training on Kentucky's legislated Water Quality Act which must be implemented by 2002. Surveys conducted last fall (1997) indicate that less than 10% of the farmers in most counties have Agriculture Water Quality Plans; however, Breckinridge County Extension Service (participants in the training) indicates that over 50% of their farmers have plans.

Following the statewide Stewardship Farming Field Day, five farmers constructed the unheated greenhouses. They returned to the October, 1998 field day to discuss their experiences and design modifications. All indicated they are expanding their unheated greenhouses.

- The use of cover crops, compost, manure, legumes and green manures to increase soil nitrogen has been presented often. Over 30 farmers have implemented these systems on a few acres or rows of tomatoes. On the September, 1998 field day, five farmers described the improved soil tilth, improved soil moisture, and decreased costs. All indicated they are using the money they saved to expand their acreage under the given production systems for 1999. Several other farmers who were present indicated they planned to incorporate these practices.

SARE
Sustainable Agriculture Research and Education
Southern Region

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Progress Report
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Developing Trained Professionals and Teaching Aids to Support Educational Programs Addressing Management of Stored Grain

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SARE grant $38,150

Objectives

1) Conduct a train-the-trainer seminar whereby county extension agents and key farm leaders will receive current information on the management of stored grains. Training will emphasize an IPM approach that minimizes insect damage, mycotoxin levels and pesticide residues thereby maintaining the highest possible grain quality and profitability for the grower.

2) Conduct a demonstration of post-harvest management systems that will begin in the fall of 1997 and be available for observation and training purposes at the seminar to be held in the spring of 1998.

3) Improve the quality of educational materials available to county agents and farmers by a)producing an instructional video tape emphasizing management techniques discussed at the seminar, and b)publishing a proceedings of the seminar which will include results of the demonstration as well as other pertinent information which could be used for training purposes.

Approach

The primary objective of this project is to improve the knowledge base of county extension agents and farm leaders regarding management techniques for maintaining post-harvest quality of grains stored in southeastern states. Training will include consideration of the unique insect and mycotoxin problems associated with high temperature and high humidity conditions during storage and emphasize a systematic management approach.

The University of Georgia Cooperative Extension Service along with the Alabama Cooperative Extension Service will work together to conduct a train-the-trainer seminar at the Coastal Plain Experiment Station in Tifton, Georgia on March 25, 1998. The 1890 land grant universities, Fort Valley State and Alabama A&M will be invited to participate along with representatives of key organizations such as the Georgia Corn Commission, the Alabama Feed Grains Commission and the Georgia Corn Growers Association.

The project will address the increased insect and mycotoxin problems associated with grain stored in southeastern states. One of unique problems that will be addressed is field infestation of corn by the maize weevil, the key pest of stored corn in the south.

Results

As of this report, the project is nearing completion. The training seminar was conducted on March 25, 1998. Thirty trainees attended the seminar and rated it a 9.4 on a scale of 1 to 10 with 10 representing the best training they had ever experienced. Classroom as well as "hands-on" training sessions were conducted as planned. The 8-month storage demonstration was conducted and the results were available for viewing at the seminar. Participants saw the results of four different storage scenarios and learned that grain quality and value increased as managements inputs increased. Production of the instructional video tape is nearing completion. Many hours of video tape have been edited to create a 30 minute presentation that covers grain management from harvest to sale. The edited tape will be complete as soon as graphics and music can be added. The final version is expected to be mailed within two months.

We hope that by communicating the results of this project to people that serve as key sources of information, the project will eventually impact all grain producers and grain handlers in the southeast and improve the quality of our grain and the profitability of grain production. Increased grain production in the southeast will improve crop rotations and increase utilization of minimum tillage systems.

Several grain associations in Alabama and Georgia have already expressed interest in having this training repeated. The Southeastern Wheat Alliance has expressed interest in repeating the training with an emphasis on wheat.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-17
Progress Report
December 1998

Overcoming Training Obstacles: A Realistic Cost-Effective Approach

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SARE grant **$10,000**

Focusing on long-term sustainability of farms and rural communities in South Carolina, as reflected in the South Carolina Strategic Plan, and the Southern Region SARE Program, there is but a single objective of the State Training Enhancement Project as submitted in this proposal: Sixty (60) agents, will be trained to overcome identified obstacles that would impede the effectiveness of training outlined in the Strategic Plan.

Predominant is the implementation of a cost-effective and realistic approach to the elimination of obstacles that would result in a definitive improvement of training.

In South Carolina, identified obstacles would include, but not be limited to the insufficiency of:

- delivery of information
- technical support by professionals extant to the institution
- on-site demonstrations
- cross-education between large and small scale farmers
- marketing of training programs to potential participants
- comparative data developed to reflect cost-benefit analysis of conventional versus alternative farming

Paramount to the survival of limited-resource-small scale farmers, is the reduction of their risk of vulnerability to continuing changes taking place in agriculture. Such changes have been technological, financial and demographic.

Overcoming obstacles to such training, in a manner that is realistic and cost-effective provides the greatest enhancement to sustainability and attainment of goals as delineated in the South Carolina State Training Program.

Farmers must be empowered with essential management tools for continued survival. This is particularly true for limited resource small scale farmers. Changes in agriculture have made their survival more vulnerable. Such changes have been technological, financial and demographic.

The sense of urgency to empower limited resource small scale farmers with these essential "tools" is of the utmost importance. The most cost-effective means to accomplish the task is through collaborative training of farm agents and similar professionals; appropriate organizations; governmental agencies; and farmers themselves.

We are trying to overcome these obstacles by working towards the improvement of:

- agents to fully embrace unconventional agricultural practices
- state and county level support for extension administrators
- coordination of educational programs and activities with other organizations and agencies

We are developing a mailing list of supporting agencies and non-governmental organizations and will produce a booklet for farmers as a reference tool. A survey was developed to compile data on limited resource small scale farmers. A tour of a large scale dairy farm using sustainable grazing practices was conducted. The tour was of Tom Trantham's Dairy Farm in Pelzer, South Carolina. Thirty-eight (38) individuals toured the farm.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-18
Progress Report
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The First Requirement of Agricultural Sustainability: Efficient Management of Available Resources

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SARE grant $60,000

Previous training by the South Carolina Cooperative Extension Service focused its efforts on the training of agents in the precepts of sustainable agricultural production and integrated pest management practices that would eventually result in the reduction of off-farm inputs by practicing farmers. This proposal will meet the needs of limited resource farmers by training the trainer(s) to become more effective agent(s) in the transfer of knowledge of management strategies and effective utilization of agriculture policy to create a more sustainable agriculture.

Sixty (60) agricultural agents participating in a South Carolina Train-the-Trainer mini-course/ workshop will acquire knowledge and develop skills to:

- Help farmers define specific objectives and develop short and long term strategies for a profitable and sustainable agriculture.
- Identify practical and accessible information resources and recommendation for sustainable agriculture practices.
- Design and test appropriate integrated management strategies that will efficiently utilize available resources, reduce off farm inputs and generate a profit.
- Increase capacity to analyze and critique integrated systems research, improve.their decision making and teaching skills involving complex relationships within/ among biological, financial and/or social systems.
- To identify management problems and recommend integrated management strategies of whole farm systems that will generate a profit and perpetuate ownership of family farms.
- Build greater institutional support for sustainable agriculture training both within and outside the land grant institution.

Limited resource small scale farms, the type most frequently operated by African and Native Americans are susceptible to the overall changes that have taken place in agriculture. There has been and continues to be a significant and disproportionate decrease of Black and Native American farmers; and a disproportionate amount of land lost by these groups. They do not have sufficient knowledge about management strategies that are influenced by tax laws, terms of credit, agricultural farm policy, types of farm business ownership, inheritance transfer mechanisms, and the legal instruments for maintaining or acquiring land. The emphasis of the first requirement of sustainability for limited resource farmers is to help them become more effective managers of limited resources, both renewable and non-renewable.

Farm agents and similar professionals, appropriate organizations, and governmental agencies must help farmers define specific objectives and develop short and long term strategies for profitable and sustainable agriculture. This group must also identify management problems of limited resource farmers and recommend integrated management strategies that will generate a profit and perpetuate ownership of family farms.

The majority of agricultural agents have limited or no experience in the management of diverse alternative farming systems. Because of this and other societal reasons, there are serious doubts and frequently a bias against alternative systems that require enhanced management skills. However, these strategies possess a level of understanding that greatly exceeds that of those strategies used in the current conventional system.

The plight of the limited resource farmer is so unique and severe that any attempt to improve management skills requires specific research initiatives and educational programs targeting management problems and agricultural policy. The attention given to agricultural management is extremely focused toward a large corporate commercial conventional agriculture system, accessible to those with resources above those of the limited resource farm family. Emphasis has been placed on limited resource farmers to make them highly productive, efficient and environmental managers as a result of more relevant training of agricultural agents to efficiently and effectively address managerial problems of farm systems.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-19
Progress Project
December 1998

Nuisances in the Community: Training on the Issues and the Methods of Mediation

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American Livestock Breeds
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Carolina Farm Stewardship
Association

NC Dept. of Agriculture

Partners in Agriculture

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Kenny Haines
Stefan Hartmann
Alex Hitt
Jim Letendre
Jim Smith
All producers

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Warren Wilson College

Mark O'Farrell
Cooperative Extension

John Sabella
Rodale Institute

SARE grant $ 56,000

Objectives

The objectives of the "Nuisances in the Community" video project include examination and analysis of the following areas:

1.) Nuisance laws in the Southern Region

2.) Right-to-Farm laws in the Southern Region

3.) Anti-corporate farming laws in the South ern Region states

4.) Odor regulations in the Southern Region

5.) Environmental regulations controlling live stock operations in the Southern Region

6.) Examples of community confrontations oc curring in the Southern Region around the ex pansion in size of agricultural operations, particularly livestock operations

7.) Principles of alternative dispute resolution, generally, and mediation laws in place in the Southern Region specifically;

8.) Examples of successful mediation techniques and discussion of how mediation principles can be effective in resolving community disputes

9.) How the principles of sustainable agriculture can be used to address community concerns associated with nuisance problems and agricultural operations

The project is intended to provide the agricultural professional and sustainable agriculture professional, as well as those involved in agriculture production with information, and hopefully some level of understanding, of a myriad of complex legal areas impacting on the growing trends in large, corporate, agri-business farming. These legal areas include nuisance law, right to farm legislation, anti-corporate farming laws, and environmental regulations. All these legal areas are under intense scrutiny in our state capitals and in the nation's capital with the advent of large corporate agribusiness concerns. The project will also provide the agricultural professional with an exposure to the tool of mediation or conflict resolution as a means of resolving community disputes relating to agricultural operations. This is a relative new arena for mediation, as it involves the resolution of conflict with regard to community-wide concerns, and with regard to the appropriate use of natural resources. The traditional use of mediation within the agricultural community has been solely on financial issues, with only a few exceptions. The project will examine groundbreaking work in this area and explore the potential use of mediation in resolving these community-wide conflicts.

Since the time of the initial award, the principal investigator has been involved in a variety of tasks associated with the video production and associated written materials. As originally presented, the project was to have included an analysis of the nuisance, right to farm, anti-corporate farming, and environmental regulations and statues with regard to each of the 13 southern states. This information was to be presented, according to original plans, via 13 separate video productions. After consulting with the video production professionals associated with the project, we determined that this method would be cost prohibitive, therefore, the project will be presented via one video, containing standard language and explanations applicable to each of the thirteen states, accompanied with written material particular to each of the states. This method of presentation will allow us to accomplish the end result within the budget constraints.

Our video footage chronicles the volatile settings for conflict between corporate farming or factory farming interests and rural communities. The community groups at the beginning of this funding period which were most active have been eclipsed by activity in the other states of the region. Groups have done miraculous things in educating themselves and the public regarding applicable laws and regulations and applicable science (or lack thereof), while the corporate entities continue an increased presence within the states.

We will be disseminating 10 copies of the video and written materials within each of the 13 southern states. These materials will, in most cases, be disseminated through the state sustainable agriculture coordinator. We will offer additional copies of the finished products at a nominal fee to cover the costs of reproducing written materials and video. Publication and advertising of the final product will occur through appropriate sustainable agriculture publications as well as the general media.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-20
Progress Report
December 1998

State Training in Integrated Erosion Control Systems

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Cooperators

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Oklahoma SAWG

Kerr Foundation

SARE grant $80,013

Objectives

1.) Improve producer involvement in sustainable agriculture training in Oklahoma consistent with the state strategic plan.

2.) Improve curriculum development related to erosion control in Oklahoma to strengthen the state strategic plan.

3.) Effectively train 120 professionals in Oklahoma in erosion control.

4.) Develop new integrated curriculum that could be used effectively in other training events with emphasis on distance learning methods

Approach

The proposed State Training project will (1) train at least 120 Cooperative Extension Service agents and other professionals in integrated erosion control systems; (2) share results and what was learned from the planning processes used in the companion State training Enhancement Project with other potential trainers; (3) facilitate farmer participation in the planning, delivery and evaluation of sustainable agriculture training on Oklahoma and (4) develop new integrated curriculum that could be effectively utilized in other training events with particular emphasis on distance-learning methods.

The State Sustainable Agriculture Working Group has determined that a high priority for professional training in the state is erosion control and that it is consistent with the specific goals as set forth in the Sustainable Agriculture Strategic Plan. The project will be accomplished with broad collaboration of diverse groups; will leverage other inputs by capitalizing on research and demonstration projects already in place; and the integrated curriculum will be appropriate to be used in other training events.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-21
Progress Report
December 1998

State Training Enhancement Project to Ensure Effective Sustainable Agriculture Training in Integrated Erosion Control Systems

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Cooperators

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SARE grant $10,000

Objectives

1. Increase farmer involvement in Sustainable Agriculture training in Oklahoma consistent with the State Strategic Plan.

2. Build greater institutional support from a wide field of agencies and organizations for Sustainable Agriculture training in Oklahoma.

3. Improve curriculum development related to erosion control in Oklahoma to strengthen the State Strategic Plan.

Approach

The proposed Training Enhancement Project will (1) increase farmer involvement in the state sustainable agriculture strategic planning process and in training in Oklahoma; (2) help build greater institutional support for sustainable agriculture training: and (3) improve curriculum development related to integrated erosion control measures to strengthen the state Strategic Plan.

The project will convene a broad based Steering Team including farmers to plan interdisciplinary erosion control training, a priority identified by the State Sustainable Agriculture Committee. Through the process of providing input and guidance to the proposed training the project will address the identified barriers to effective training including (1) lack of involvement of farmers in strategic plan implementation and training; (2) lack of institutional support for sustainable agriculture training; (3) professionals who have negative perceptions of sustainable agriculture; and (4) lack of up-to-date, state specific, curriculum in integrated erosion control training. The project will result in a modified State Sustainable Agriculture Strategic Plan.

The Steering Team will be comprised of all groups who have professionals involved in education and transfer of information about sustainable agriculture. Of special note, in addition to farmers, representation will include Langston Universtiy, Oklahoma's 1890 University; Bureau of Indian Affairs and tribal professionals; and our major non-governmental institutions. Other major collaborators will include OCES, NRCS, FSA, ODA-Forestry Services; Oklahoma Conservaiton Commission; Oklahoma Association of Conservation Districts; and Rural Conservation and Development Districts.

It is intended that this State Enhancement Project will lead into the proposed Training Project which will provide funding to deliver the actual training. It is hoped that both can be considered together so we will not lose momentum of the Steering Team and the involvement of the farmers toward the actual training.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-24
Progress Report
December 1998

Barriers to Sustainable Agriculture Training in Oklahoma

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SARE grant $10,000

Objectives

1.) To arrive at a definition or vision statement of the sustainable concept and how sustainable agriculture concept can be usefully applied to the benefit of Oklahoma agrultural rural and urban clientele. The sustainable agriculture vision for Oklahoma should be clearly communicated with faculty, staff, and all interested public clientele.

2.) To provide guidance on how sustainable agriculture concepts can be integrated with current educational and research programs in DASNR. This will include identifying areas of complimentarity with current programs, to suggest areas of additional programming, and to help set priorities for the allocation of increasingly scarce resources. One outcome of this objective would be to indicate how sustainable agriculture research and education fits in to the DASNR strategic plan.

Initial sustainable agriculture training efforts in Oklahoma have met with considerable resistance due to misconceptions and preexisting biases about what sustainable agriculture is and isn't. These negative connotations are made worse by the lack of a clearly stated definition of sustainable agriculture, in the context of mainstream commercial agriculture in Oklahoma, and the inability to demonstrate how sustainable agriculture concepts can be complimentary with, and extensions of, current programming efforts rather than a vastly different new program area. This proposal recognizes this as a major barrier and proposes a plan of action to overcome this obstacle as a prerequisite to future training in sustainable agriculture.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-25
Progress Report
December 1998

Building Capacity in Sustainable Agriculture: A Comprehensive Training Program in Organic Farming Systems

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Partner s in Agriculture

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Rodale Institute

SARE grant $ 97,500

Objectives

1.) Conduct a series of workshops for extension specialists, agents, mentor farmers, consultants, NRCS employees, and other teaching professionals, emphasizing how the major components of organic production systems can be incorporated into a productive management system. A major focus of each workshop will be the integration of the various crop production factors into a working system. Graduate credit through NCSU will be offered to those agents who participate in the entire series.

2.) Set up demonstrations at The Center for Environmental Farming Systems (organic unit), and on farms, to provide hands-on experiential learning opportunities in conjunction with each of the workshops.

3.) Integrate organic producers into the training by including tours of various farms, and including farmers with specific expertise as facilitators and trainers at the workshops. A tour to Rodale Institute has already been proposed for 1998 as an advanced training for ag agents, and will be integrated into this program.

4.) Develop a training manual which will include chapters from each of the workshops. The edited training manual will be made available to other States in the southern region.

5.) Establish a farmer-to-farmer mentorship program to utilize successful organic growers in training other prospective growers. Agents will also be encouraged to actively recruit interested farmers to participate in the mentorship program. The mentor farmers will be available to advise and offer support for the 'apprentice' farmers. Mentor farmers will also be invited to attend the workshops to allow them to strengthen their expertise in various areas.

6.) Existing programs providing training on organic production will be incorporated into this program, in part, by providing funds for agents to attend these activities. These include the annual CFSA conference, annual organic vegetable schools in the western part of the state and in the piedmont, and farm tours in central, eastern, and western North Carolina.

Approach

As proposed in this grant, training of agents and other ag educators took place between April, 1998 and November 1998. Six, two-day workshops were conducted, and a wrap-up meeting was held at the annual extension conference in November.

Approximately 52 NC agents attended at least one session, in addition to 12 participants from Florida and 6 from Virginia. Approximately 40 agents came to all the sessions, and completed all assignments, and 32 of those enrolled for graduate credit. Each workshop covered areas critical to organic production.

Each workshop had hands-on field demonstrations as an integral part, and most incorporated field trips and farm tours. Some examples of the field demonstrations are: planting crops at weekly intervals and observing differences in weed populations; planting strips of various winter and summer cover crops and rating them for biomass production; utilizing soil quality kits, etc.

A key component to the workshops were the integrated and interdisciplinary approach to teaching about organic production systems. Even though each workshop had a specific topic as a focus (eg., organic fertility management) , facilitators were expected to integrate other disciplines into the workshop

The Carolina Farm Stewardship Association's Sustainable Agriculture Conference was recently held and the poster session was very successful. Conference attendance was very high, with more than 500 registered. Many of the agents who participated in the training also attended this conference for the first time.

At the conference, we presented a plan to establish a mentorship program which will primarily take the form of an on-farm research network. Many agents and growers attended the session and signed up to participate. We have a very interested and enthusiastic group ready to work together on this effort. The manual is in its last stages of development, and we hope to have the first draft ready for review in February.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-26
Progress Report
December 1998

Community Food Security and Marketing Capacity Development in Kentucky

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Kentucky League of Cities

Burley Tobacco Growers Cooperative Association

Community Food Security Coalition

Kentucky CES

Pots de Creme

SARE grant **$79,970**

The U.S.D.A. Southern Regional Sustainable Agriculture Professional Development grant, provided to the Commodity Growers Cooperative (CGC) and several partners, enabled extensive collaboration with non-governmental organizations, provided participatory training and development projects for a wide variety of non-traditional alliances, and further advanced the goals of promoting sustainable agriculture in this state during 1997 and 1998. CGC refers to this collaborative training and professional development component of its work as "Community Based Farm Market Training Project," and this term is used throughout this report. This Annual Report covers activities conducted during a time from from July 1997 through November 1998, although some background information is provided for several components of the project, reaching as far back as 1996.

In addition to the groups and organizations listed as cooperators, CGC has collaborated closely with the Kentucky Department of Agriculture, the Kentucky Governor's Director of Ag Policy, the Community Farm Alliance, Kentucky Farm Bureau and Kentucky Ag Project 2000 and others in achieving the goals of this project.

Presently, political and economic transformations taking place, on both the national and international level, are changing the role of family farming throughout the United States, especially in Kentucky where agriculture is a prime contributor to the state economy. Kentucky's agriculture, with an annual farm gate value of more than $3 billion and economic impact in excess of $12 billion, is characterized by small family farms with more than 80% of the farms grossing less than $40,000 annually. Kentucky's agricultural economy is highly dependent on income from the sale of burley tobacco, and tobacco continues to play a major economic, political, and cultural function for the state.

However, as farming becomes more competitive due to the increasing dependence on automation and technology in sync with the move towards more large-scale, industrial farm production processes, small farms lose their economic viability and rural communities suffer. Therefore, in order to preserve Kentucky's small farms, the state's farming community identified a need for more market development, training, and diversification of agricultural products. By tapping more existing markets and creating new international markets for Kentucky's agricultural products, some of the uncertainty that goes along with diversification could be mediated. In order to achieve these goals, many groups/farm organizations will have to collaborate together and propose policies which will work in their favor.

In order to work towards diversification, market development, and a sustainable food system in Kentucky, CGC, through the "Community Based Farm Marketing Training Project," decided to join together and propose a number of project goals, including:

- Building community institutional capacity through training programs,
- Organizational development and management assistance and program materials;
- Ensuring access and availability for community residents to residents to fresh, locally produced food; and
- Building and encouraging local markets for farmers and their products.

Approach

In order to realize these goals, the Project Team identified four specific objectives and developed a work plan to achieve these objectives. These included:

(1) Building local capacity for improving farmers markets and expanding existing markets into public markets through developing and disseminating guidebooks for market development;

(2) Organizing community food councils and conducting community food access assessments in targeted communities by providing information and training about successful programs;

(3) Training community organizations to expand on and replicate the Harvest Festivals organized by Partners for Family Farms, and;

(4) Ensuring access to marketing and organizational assistance for farmers by providing training to extension agents, farmers, small business assistance programs and others who assist farmers associations in community food issues, market development planning, building access to capital, and organizational management for farmer associations.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-27
Progress Report
December 1998

Training Program Targeting Integrated Cow/Calf Operation Management

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SARE grant $54,340

Training and professional development opportunities will be provided Oklahoma State University Cooperative Extension Agents, Natural Resource Conservation Service personnel and Farm Credit Services officials to enhance their understanding of techniques of sustainable agriculture as related to the beef industry.

Project participants, herein referred to as "Trainers", will be exposed to the differing segments of the beef industry, the role these segments serve in the industry, and how they may be melded into an integrated package at the cow/calf level.

Trainers will experience the characteristics of beef industry segments through hands-on participation in two case studies of sustainable and integrated ranches as cattle are followed though different production segments of the industry.

Trainer experience and knowledge will be used to model case study ranches into integrated operations in terms of animal and forage production, economics and environmental nutrient balance.

Trainers will be exposed to sustainable agriculture techniques through educational tours and study of ongoing, funded field research and demonstration projects involving nutrient balance of intensive grazing operations, best management practices of using poultry litter as a fertilizer or as a feed for beef cattle, and environmentally sound methods of controlling undesirable weed and brush infestations, especially broomsedge.

A forage base evaluation model and computer software will be developed to assist trainers as a decision-making tool for producer recommendations.

Trainers will receive equipment and supplies to enhance educational activities directed toward their target audiences; the commercial cow/calf producer in southeastern Oklahoma.

Trainers will conduct educational activities in their individual communities utilizing professionally designed displays, brochures, professional educational slide sets and narratives and computer software.

A narrative of experiences and observations gained through this project, including major points covered, will be maintained and provided to project participants.

An evaluation of the understanding of sustainable beef and forage production by Cooperative Extension Agents will be conducted at the conclusion of the project.

Approach

The first significant activity to occur was a tour of northeast OK and southeast KS cattle operations and research sites. Extension agents, NRCS personnel and ranchers participated. Tour stops included those selected for their integrated production management, environmental concerns and reputation. Other tours are planned as activities associated with case studies allow.

Nineteen display boards for use by educators were recently received. These display boards will be placed in prominent locations frequented by agriculture producers, specifically ranchers. The boards promotes research-based information regarding aspects of management integral to profitability and environmental preservation. Initial topics for displays include: factors affecting prices of feeder cattle sold at auction, riparian areas, implants and their use and internal parasites of beef cattle. A total of 12 display material sets are planned for production.

An objective of this SARE grant is the development of educational programs by selected participants. This exercise required the development of three components; a review of literature on a specific subject affecting integrated beef production, and the composition of a producer handout and educational slides. The goals of this objective were to encourage the development of expertise by educators in the use of computer programs including PowerPoint® and Word®, promote the development of educational program materials for duplication and use by other educators, and heighten confidence levels in the research and development of future programming. These programs have been developed and many are in use. A meeting to highlight these efforts and share materials with others is planned for December, 1998.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-28
Progress Report
December 1998

Grassroots Empowerment in Kentucky's Local Conservation Districts

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Cooperators
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SARE grant $86,280

Objectives

The purpose of the project is to help develop agriculture/conservation leadership at the county/district level and to create a framework of leaders that understand the public significance of the Kentucky Agriculture Water Quality Act, and the impact of the development of water quality plans for each farm on Kentucky's sustainability.

Approach

Kentucky's Agriculture Water Quality Act, enacted by the General Assembly in 1994, requires all Kentucky landowners with ten or more contiguous acres of farmland develop an individual agriculture water quality plan. These water quality plans are to be completed and implemented by October 2001. Our limited number of resource persons and technical advisors must have "grassroots leadership support' in order to accomplish this task.

This SARE project will provide training and guidelines for professional agency representatives and for Division of Conservation Supervisors and County Extension Agriculture Advancement Council members from the counties. This cooperative leadership approach is needed to accomplish the objective of reaching the estimated 350,000 plus landowners affected by the Act.

A curriculum development committee was appointed to plan the curriculum, identify participants and training sites. The first meeting on June 25, 1997 included fourteen members from seven different state and federal agencies and farm organizations. Six state-wide training sites for the workshops were identified and sub-committees were selected to enroll participants, develop curriculum and develop resource materials.

The over-all objective was to improve environmental quality from the agriculture community by the implementation of sound environmental practices and the efficient stewardship of our natural resources.

More specifically we identified resource and technical advisors from each of the six geographic regions of the state and trained these "grass-root leaders" from Kentucky's 120 counties. Behavioral objectives included enhancing the knowledge base in agriculture and natural resource issues; to learn techniques that will help resolve conflicts arising from adverse farmer reactions to the Agriculture Water Quality Act and to establish a statewide network of resource persons and grass-root leaders to help implement the act.

In preparation, 56 resource persons representing six agencies - Kentucky Division of Conservation, Kentucky Division of Water, Kentucky Division of Health Services, Kentucky Division of Forestry, USDA/Natural Resources Conservation Service and the Cooperative Extension Service participated in a training preparation session in October 1997 to prepare to lead the six regional meetings.

Six, two-day Regional Farmer Leadership sessions took place at the following locations: Lexington, Kentucky, Rough River State Park, Cumberland Falls State Park, Carter Caves State Park, General Butler State Park and Lake Barkley State Park during the period from November 4 to December 3, 1997.

These sessions developed "grass-root" leadership which created a framework of leaders who understand the public significance of the Kentucky Agriculture Water Quality Act and the development of water quality plans for each farm. Leadership teams at the local level were prepared to create local educational and planning opportunities to disseminate information about agriculture water quality.

The workshop included topics on local leaders opportunities, education skills training, leadership and mediation skills training, construction and management of best management practices and provisions of the Kentucky Agriculture Water Quality Act. Small group interactive sessions included hands-on work with computer programs. County teams supported by resource persons prepared county strategy and schedules for implementing this program in their home counties.

Two-hundred and fifty-nine "grass roots" leaders from 92 Kentucky counties participated in the 1997 SARE Leadership workshops. They developed leadership skills and gained knowledge in preparing on-farm agriculture water quality plans. Thirty members of the planning committee and nine guests also participated. Follow-up evaluations from these farmers have now revealed a dire need for training professional agriculture advisors and major farmer leadership groups at all levels. Farmers are thus taking the lead in developing new innovative training proposals at the "grass roots" level.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-29
Progress Report
December 1998

Utilizing On-Farm Case Studies for Teaching Advanced Management and Marketing to Extension

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SARE grant $10,000

Specific learning objectives were developed for each teaching location on six farms. Our efforts focused heavily upon using the systems approach to decision-making and to train county Extension faculty to teach farm families about the development and implementation of alternative management and marketing strategies. Obviously, the systems approach involves integrating production, management, marketing, and environmental concerns into a total plan, including the development of marketing plans. The training was an advanced series for Extension personnel on these topics with application of the teaching materials to actual farming operations and farm families in a given Extension service district. Attention was focused on behavioral changes in the Extension staff which should stimulate their audiences to implement positive changes.

Specific objectives were as follows:

1.) Extension personnel will learn and teach farmers improved strategic planning and management strategies.

2.) Extension personnel will learn and teach farmers improved marketing strategies.

Approach

The sustainable agriculture planning process in Tennessee identified the systems approach to decision making and implementation of improved marketing strategies as high priority subjects. The training program included using a case study approach in addressing these subjects. Training was conducted in 12 sessions on six different farms across the state. Specific subject matter was modified to match different educational program needs for Tennessee's diversified agriculture. Relevant examples were tailored for each training location.

Training sessions involved integrating production, management, and marketing into a total plan. Information management systems were incorporated as a critical part of total resource evaluation on case study farms.

Advanced management and marketing training topics were taught in classroom style sessions with Extension personnel for the first half of the training. The second half of the training was conducted on an actual farm. Extension personnel discussed management and marketing strategies used on the farm by the farm family. The discussion focused on an evaluation of strengths and weaknesses of decisions made on the farm and the likely outcome of alternative decisions.

Project goals and objectives involved teaching agents to teach the above subjects to other farmers. Actual experience in working with a given farm family reinforced the relevance and importance of the subject matter. As a part of the training process, farm families were to interact and question Extension agent suggestions and recommendations. Farm families at the six locations were an integral part of the teaching package.

A total of 437 agent days of training was conducted in the 12 training sessions.

A comprehensive evaluation of the training revealed the following outcomes:

- Agents indicated a 30 percent perceived increase in their knowledge and understanding of long-run strategic planning.
- Agents reported a perceived 32 percent increase in their ability to assist a farm family in addressing the "right" questions and developing a long-run farm plan.
- Agents also indicated a perceived 27 percent increase in their abilities to help farm families develop and evaluate management and marketing alternatives.

Feedback from Extension agents over the past few months indicated they have effectively utilized teaching materials included in the training. Future sustainable agriculture training under this project will focus on follow-up to this training and further application of the systems approach to decision making with emphasis on advanced farm management and marketing strategies.

The following example comments made by Extension agents on the evaluation forms clearly document their overall favorable reaction to the training:

"On farm training excellent, farmer views important and enlightening."

"The more I see this information the more comfortable I feel about talking with producers."

"Liked the relaxed environment in which the information was presented."

"I really liked discussing and making decisions about real life questions."

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-30
Progress Report
December 1998

Integrated Production of Sustainable Crops for Small Farmers in North Florida

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SARE grant **$8,375**

Objectives

The objective of this Training Enhancement Project is to develop educational materials and demonstrations of alternative crops and production practices to support training in sustainable agriculture for Extension agents, other public agency professionals such as those working for the Department of Environmental Protection, the Natural Resource Conservation Service, and the Florida Water Management Districts, and leaders from the North Florida small farm community.

Specific objectives are to:

1. Train at least 30 county Extension faculty members and at least 30 farmers and other professionals in the concepts of multi-crop farming systems emphasizing native crops and ecologically sound production practices.
2. Assist county faculty in the establishment of demonstration plots utilizing these crops and principles on farms in North Florida.

We have spent the first months of this grant project gathering information and materials, revising existing publications, developing new publications and other resources, and preparing for two upcoming in-service trainings for county Extension faculty, growers and others. University of Florida faculty have established collaborations with personnel from the University of Georgia, Auburn University and the USDA at Tifton and Byron, Georgia. We are developing contacts with county Extension agents, current producers of alternate crops, and potential growers of alternate crops.

This program will derive much of its impact from revising and re-packaging existing resources together with new resources into a set of educational materials that can be used by Extension and other agricultural professionals to disseminate information about farming systems and alternative enterprises that are particularly well adapted to the panhandle region of Florida and similar regions in South Georgia and Alabama. Accordingly, we have initiated plans to purchase resource materials for use in our trainings, and we have accepted an in-kind donation (additional match) of resource books valued at five hundred dollars (500 copies of "Dooryard Fruits for Florida", sold retail for one dollar each). Existing resources are being revised and made available through University of Florida channels (e.g., "The Persimmon", by T.E. Crocker. HS 20, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Date first printed: August 1984. Date revised: June 1998. 4 pp.). New materials are being developed including slide sets, new fact sheets (e.g. "Dooryard Fruit for Central Florida" by Andrew Rose), and a list of nurseries from which deciduous fruit planting stock is available. This new format will emphasize sustainability while individual materials can continue as an integral part of other University of Florida/ IFAS resources.

The first of the planned in-service trainings occurs just three days after the due date of this report. The November 18 activity will teach county Extension faculty about sustainable, alternate crops and their production in the north Florida and south Georgia areas.

A second planned activity will occur July 14 and 15, 1999. For this event, we will invite county Extension faculty, growers, Master Gardeners, and other public agency professionals such as those working for the Department of Environmental Protection, the Natural Resource Conservation Service, and the Florida Water Management Districts. Invitations to these individuals will go out across this region of the Southeast to participate in tours of demonstration plantings of alternate and other crops at the University of Florida North Florida Research and Education Center (NFREC) in Monticello. This training will involve commentary and guided tours through collections of ornamentals, native plants, fruits, and nuts at the NFREC-Monticello. Using an "open house" format, the one-day training is offered to growers, other professionals and county Extension faculty on July 14, and is repeated for Master Gardeners and county Extension faculty on July 15. Extension Specialists' commentary will provide detailed information about growth, production (including sustainability), functional use and aesthetic value of the fruit, nut, native and ornamental species viewed during the tours.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-31
Progress Report
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Development of Sustainable Beef Checksheet, Manual and Workshops

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SARE grant **$69,936**

Objectives

1. Through the design, evaluation, and subsequent us of a sustainability check sheet, educators and producers will learn what to consider in assessing a beef cattle farm

2. Through the use of a manual on sustainable beef cattle management, educators and producers will learn the complex (biological, financial and social) interrelationships that must be considered when planning and improving beef cattle enterprises in a whole-farm context

3. Potentially 180 educators and producers will be trained, through two sustainable beef management workshops, to recognize and assess these interrelationships.

Approach

A group of individuals (producers, NRCS personnel, county extension agents, and ATTRA technical specialists) developed a beef farm sustainability check sheet. The check sheet is designed to stimulate critical thinking of producers and educators in establishing priorities to attain profitability, ensure environmental integrity farms and maintain quality of life for farm families. The check sheet contains over 200 questions to assess a farm with primary emphasis on cow-calf production on pasture programs. Three diverse teams of the above listed individuals evaluated the check sheet by visiting six farms in the region and from those visits, recommendations were made on how to use the check sheet.

A notebook of ATTRA publications, research reports, and other information was assembled to be used in workshops, as the precursor of the manual. Items from the check sheet were identified. These items are suggestions for inclusion into the manual now being written for dissemination to educators and producers. Writing the manual is the last component of the project.

The first workshop using the check sheet as a base learning tool was held October 7-9, 1997, at the Highland Rim Experiment Station in Springfield, TN. Enrollment was 42 producers, extension agents and NRCS personnel from seven states. The second workshop was taught September 21-23, 1998, at the Middle Tennessee Experiment Station in Spring Hill, TN. Enrollment was 23 producers and educators from eight states. Three two-day workshops for Arkansas NRCS personnel were held in Fayetteville, Russellville, and Marshall, AR with a total attendance of 93 persons.

The check sheet is available to ATTRA callers as a standard materials item and is on the ATTRA website as well. A presentation on the check sheet was made at the Southern SARE PDP meeting in Memphis January 22, 1998. Additionally, presentations on the sustainable beef workshop and check sheet were made in February at the Southern American Society of Animal Science meetings. A poster presentation was made at the SARE meeting in Austin. Other presentations have been made to county cattlemen's groups and various workshops in other states. We have received requests from other groups to conduct workshops in other areas.

Results

We have learned from farm visits and workshops that the check sheet is very complete and does stimulate critical thinking. The check sheet is long and complex; therefore, an abbreviated version has been developed for educators to use with persons who may not be as advanced in their production system as those who benefit from using the longer version. Feedback from producers has been very positive, even though they found working the check sheet was a challenge for them. Educators have been mixed in their reviews, primarily from the standpoint they have concern that "average" producers would use it. In one state the check sheet was used to train new extension agents as to how to work with producers.

An important contribution of the check sheet has been the benefits of bringing together a diverse group of individuals. Thought processes of individuals have been expanded, more collaborative programs developed, and other grant activities planned. A producer network has been established from the group developing the check sheet and producer grant activities are being discussed.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES 97-32
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Responding to Expressed Needs: Regional Training with Dairy Systems Manual and Software

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SARE grant **$48,500**

Objectives

1.) To introduce interested professionals in the Southern Region to the Sustainable Dairy Systems Manual and Software.

2.) To train participants in the use of the manual and software to address specific management problems within particular dairy subsystems or in the integrated dairy system as a whole.

3.) To demonstrate that the successful application of an integrated systems approach to dairy management problems can serve as a model for other commodities or enterprises on Southern farms.

4.) To make participants aware of the processes used to assemble and manage a successful multi state, multi disciplinary Extension educational effort and to demonstrate the professional development potential of such projects.

5.) To demonstrate that users can modify key variables in the software component of the SDS to make the materials and resulting analyses appropriate for their state rather than reinventing the SDS process. This objective alone has the potential to multiply the efforts of the SDS team many fold.

Approach

This regional training project was a direct outgrowth of the SARE supported Sustainable Dairy Systems project. In that project a group of twenty-five Extension specialists and agents from the University of Tennessee and the University of Kentucky developed an integrated systems manual for evaluating changes in dairy farm management systems. Participants from agricultural economics, animal science, agronomy, and agricultural engineering assembled a twelve chapter, 600 page manual and accompanying software.

The Sustainable Dairy Systems Manual and Software (SDS) has been field tested on more than 350 Tennessee and Kentucky dairy farms. Prior to this regional training effort, one hundred thirty (130) agricultural agents, area specialists, and NRCS personnel from Tennessee, Kentucky, and Virginia were trained to use the manual and software in three multi-state, three-day training sessions in March 1996, December 1996, and May 1997. Two Tennessee and one Kentucky dairy farmer also participated in the development stages and training workshops.

In addition to direct training for agents, the SDS was featured at the Southern Region Deans and Directors meeting (1996) and in four international, nine national, and seven regional presentations and papers including the meetings of the American Forage and Grasslands Council (1996), the National Association of County Agricultural Agents (1996), American Farm Bureau Federation (1997), and the American Dairy Science Association (1997 and 1998). Audience response from presentations with SDS suggested that interest in training beyond Kentucky and Tennessee was strong. Thus the proposal for regional training with SDS was indeed "responding to expressed needs."

Regional Training

The initial proposal for Southern Region SARE training was for a single three-day workshop limited to forty participants. Strong regional demand led to expanding the format to two, multi-day workshops at two locations, North Redington Beach, FL and Charlotte, NC. Registrants were offered a full set of materials including the SDS manual, software, and problem set, two days of hands-on training, and a $225 travel scholarship. Registration was limited to thirty participants at each location, and both workshops filled. There was some attrition due to unforeseen travel, scheduling, and medical reasons so final participation was fifty-two.

Seventeen members of the original SDS development team planned and conducted the regional training. Building on experience gained in the first three TN/KY trainings, the team developed a hands-on problem solving exercise involving a major expansion plan for a hypothetical mid-south dairy farm family. The family is planning for a married son to return to the farm. To assure economic and environmental sustainability, the herd size will increase from 100 to 200 cows and the dairy facilities will be relocated away from a creek with installation of new feeding, housing, milking, and manure management facilities.

Regional training participants used the SDS manual, software, and a portable laptop computer lab to evaluate the cost changes associated with this scenario. Registrants were preassigned to two-member teams and SDS project coordinators introduced them to the

manual, software, and the systems development process. SDS team members led the participants through the various subsystem changes. A trainee to trainer ratio of less than two to one insured that participants had plenty of help with questions or difficulties associated with the manual and software. The software was projected continuously on a screen at the front of the room and flow charts were provided in hard copy and projected on a separate screen to assist participants progress through what could, at times, be complicated processes.

Audience

Geographic and disciplinary coverage of the SDS training was excellent. Every state and territory in the SARE Southern Region was represented at the regional training (see attached registration list). The audience consisted of state specialists from 1862 and 1890 schools, area specialists, and county extension staff. Dairy and nutrition specialists from Animal Science worked along side Agricultural Economists, Forage specialists, Agricultural Engineers, and Veterinarians. About half the audience were county or area Extension agents with assignments or interests in dairy.

The disciplinary diversity of the SDS training is a strong endorsement of the systems nature of the manual and software. As was the case in the development of SDS, not every specialist or agent agreed with every concept or coefficient in the manual; however, they all did agree that SDS is an integrated systems tool which forces users and decision makers to be aware of the system impacts of management activities on a dairy farm.

Sustainable Dairy Systems was developed initially for Kentucky and Tennessee climate, crops, and conditions. The SDS team had some concern about the applicability of the product across a region that ranged from Puerto Rico to West Texas. However, participants rated the problem as realistic (4.2 on a 5.0 scale) and numerous written comments indicated they planned to take SDS home and use it right away.

Results

Based on geographic and disciplinary diversity and the responses of the participants the SARE Southern Region Training with the Sustainable Dairy Systems Manual and Software was a success. Every state and territory in the region sent participants. State and area specialists along with county agents attended the training. All the disciplines associated with dairying sent participants. Eighty-four percent of participants indicated that they would be able to train others in their states to use SDS. When asked on the training evaluation form to indicate the number of dairy farms they would expect to use SDS with in the next year, twenty-nine participants reported an estimate of 516.

Since the workshops, participants from two states, Georgia and Louisiana, have inquired about availability of materials and software to conduct their own training workshops. The Louisiana participants are working on a set of default herds to supplement the five default herds included in the original SDS software. They plan to modify the defaults to more closely represent Louisiana conditions. This answers the concerns about the regional applicability of SDS.

The overall evaluation of the workshop averaged 4.5 on a 5.0 scale. Effectiveness of the problem rated 4.2 and increase in knowledge and interest rated 4.3 and 4.5 respectively. Complete evaluations from both workshops are included in the appendix.

Participants left a total of two and a half type written pages of comments on their evaluation forms. Some very good constructive suggestions from the first workshop were incorporated in the second training and subsequent software revisions. Most of the comments were very supportive. We close with this one: "I am really impressed by the detail of this software and the simplicity of its use. The ability to combine the costs of production with both the biological needs of the herd and engineering specifications of the farm is a great improvement. I strongly encourage that you expand your efforts to make the materials and software available to extension agents."

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-33
Progress Report
December 1998

Alternative Sustainable Agricultural Practices for Selected Crops in Puerto Rico

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SARE grant **$10,000**

Objectives

1. To stimulate agricultural professionals, producers and other groups to get involved and aware of alternative sustainable practices for coffee, starchy crops, and general agriculture production.
2. To collect sustainable practices in the referred subject matter from farmers, agricultural professionals and interested institutions.
3. To prepare three abbreviated compendiums containing such practices.
4. To distribute the information among the above mentioned clientele.
5. To follow up adoption of those practices.
6. To enhance our sustainable agriculture strategic and training plans.
7. To prepare materials available for other countries and Spanish audiences in the United States.

Approach

On 1997 the Agricultural Extension Service received a grant from the SARE Professional Development Program for the development of a project to compile, develop, publish and distribute information about sustainable agricultural practices in coffee and starchy crops. It was justified by the lack of recent educational materials related to reducing the impact on the environment from severe soil erosion and the intensive use of pesticide in the steep lands of Puerto Rico.

More sustainable practices were once used by farmers, but modern intensive culture replaced them. With the collaboration and help of farmers, agronomists of different agricultural agencies, investigators, conservacionists, ecologists, leaders and specialists we are collecting and recording information about sustainable practices for dissemination among the clientele.

A literature review turned up important information in books, scientific journals, technical magazines and other publications.

During the past year, nine trainings were conducted in different municipalities to give orientation to farmers and receive their feedback. At these meetings, farmers, county agents and specialists participated enthusiastically, actively arguing about the pros and cons of such practices. Finally a decision making session among the participants determined which practices are feasible. A compilation and summary was made. Some of this farmers have already adopted sustainable practices on their farms and many others are developing farms plans that include more sustainable practices. With some of the most interested, we initiated pilot projects and field tests using the practices to convince others of the benefits and advantages. Regrettably Hurricane Georges destroyed the work done prior to September 21, 1998.

After the training meeting mentioned above, the information compiled was classified and organized by theme in preliminary sketches for further use by farmers, leaders, county agents, scientific investigators and other persons involved.

During 1998 photos were taken to illustrate practices in the compendiums. Many of them were taken in the pilot projects of the farms and the established field tests. Participants visited Costa Rica to attend workshops and field trips about sustainability in coffee and starchy crops. Field trips were conducted on private farms and the Agricultural Experimental Station of the University of Puerto Rico so that farmers, leaders and county agents could observe, discuss and validate the sustainable practices in coffee and starchy crops.

Ten alternative sustainable practices were classified and over fifty compiled from the information obtained during the review of literature, foreign countries visits, field trips and training meetings. Forty three farmers, twenty one county agents, six investigators, two conservationists and one ecologist were involved directly in the process. Sketches of the compendiums were written and discussed with the participants. A video of the pilot projects and a field tests is being made.

At this moment we are editing the two compendiums and simultaneously completing other activities pending. Next year the information will be available for distribution to agriculturals professionals, producers and other interested groups.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-34
Final Report
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Multi-State, Value-Added Team Building in the Northern Mississippi River Delta Region

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SARE grant **$20,000**

Objectives

1.) Initiate a multi-state network for development of skills related to value-added diversification in agriculture. This will include

a. Form networks of agency personnel across states.

b. Initiate resource sharing strategies between these groups.

2.) Assess training needs in the region in value-added diversification. This assessment will include:

a. Identify strengths and weaknesses of each state's programs. Initiate plans of cooperation between states.

b. Educate participants of present value of value-added efforts in each state.

Approach

The goal of this project is to create a network to catalyze formation of locally-owned, value-added enterprises. Value-added food processing enterprises typically expect an 18-20% return on investment, among the highest of all sectors of the U.S. economy. Return to farms for raw commodity production averages 2-3%. Adding value to raw commodities before they leave the Delta could create jobs and keep the profits in rural communities.

Establishing networks of community-oriented entrepreneurs to nurture other budding rural entrepreneurs is the best way to overcome local power structures and ingrained, debilitating mindsets. A few non-profit organizations in Southern states have experimented with such networks. The most successful networks are not led by academics and non-profit organizations. A common trend in both the academic and non-profit world is to professionalize rural development. Agencies which adopt the "expert culture" become just another of the many gatekeepers within local political-economic power structures which invariably inhibit entrepreneurial innovation. The foundation of DEN's approach is the principle that entrepreneurs are always at the heart of sustainable rural development. Too many rural development programs fail because they rely on "experts" in rural development who have never run a business. This is especially true in the Delta where a plantation economy has created extremely polarized communities. However, a network which reaches across political boundaries, and beyond existing gatekeepers, can provide support to local entrepreneurs, cross-fertilization of ideas and can marshall resources which no single local group can provide.

The purpose of this project is to plan and begin development of a network of farmers, entrepreneurs, researchers, non-profit staff and extension agents which is not to be a high-overhead institution, but a flexible network of continually evolving, productive relationships and demonstrations.

The objectives of the project were modified somewhat by the stipulation of the granting agency that the funds be used to design a more extensive follow-up project. The project objectives remained the same, but information was also collected consistent with those objectives in order to better design the follow-up. A Steering Committee for the project organized the conference "Entrepreneurial Agriculture in the Northern Delta" held November 13 in Dyersburg, Tennessee, recruited additional members from that conference and then analyzed results of that conference and surveys on needs for training in sustainable enterprise facilitation. In addition, project staff conducted a series of interviews with people in the Delta involved in value-added diversification to contribute to the developing consensus on the optimal training plan for development of skills in creation of sustainable value-added diversification.

The interactions and responses of participants in the conference provided insight into design of training programs for facilitation of value-added diversification. We would expect that the makeup and responses of this group would be typical of potential training participants.

About half had managed a farm (45 of 91). A significant number reported having managed an agricultural business (35 of 91). Delta attendees were much more likely to have managed farms and agribusinesses. Kentucky participants were much more likely to have managed a farm than other states.

Participants rated themselves as being fairly knowledgeable about managing farms and agribusinesses (most choosing 4 or 5 on a 6 point scale). Interestingly, when the same questions were asked at the end of the survey, they rated themselves as worse at the end of the question-

naire in knowledge of managing businesses. Presumably, the questionnaire, by just mentioning various common areas of business knowledge, increased awareness of holes in participants knowledge.

To plan future training activities, participants were asked a series of questions about five potential training topics: feasibility analysis, cash flow analysis, business planning, market analysis, and value-added diversification.

Participants rated their knowledge in the five areas at about the same level. On a six point scale, well over half rated their knowledge as 3 or less on every topic. Attendees were significantly more interested in learning more about feasibility analysis and cash flow analysis than they were interested in learning about business planning, market analysis, or value-added diversification. Given the stress small business experts give to business planning and marketing, these results may indicate a need for building more awareness of the key needs for developing new agribusinesses. However, participants expressed almost identical interest in training in all five areas. At most, two of the 91 participants were not interested in training in any one particular area. All others responding (as high as 100% in two cases) wanted to participate in training. Respondents only differed on whether their interest was qualified by how easy and convenient the training was. The minimum with unqualified interest in training was 46-55 in each of the five categories. This appears to be a sufficient number to justify training on each topic in the region.

Even more encouraging for future training in the Delta is that Delta residents showed higher levels of interest in each of the five training areas than non-Delta residents.

Given the need to make entrepreneurs the center of rural development training, a series of questions were asked about entrepreneurs. Results are shown in the table at right.

These participants nearly all knew entrepreneurs and agribusinessmen. A third know an agricultural entrepreneur well enough to partner with him to develop a business plan.

These numbers are very encouraging for future training. These participants appear to have a number of contacts outside production agriculture and many appear to have relationships very conducive to further training events.

These results of the surveys and subsequent consensus-building interviews and focus groups informed the development of a training plan entitled "Motivating teams for enterprise facilitation" which is now being implemented in the region.

Recommendations of specific activities over the next two years are 12:

1. Training should be in agent/entrepreneur pairs. Nearly half of participants in the Dyersburg meetings reported they knew an entrepreneur they could partner with to develop a business plan. The chief criteria for selection will be the strength of the partnership between the agent and the farmer/entrepreneur and the potential of the partnership to facilitate value-added diversification in the Delta.

2. Initial orientation for learning pairs. Learning pairs should conduct case studies of three existing agricultural businesses in his community. These case studies will explore how each business got started in the county. Special emphasis will be on mentors and facilitators of each business.

3. Training will be in five areas based on the results of the Dyersburg surveys and subsequent consensus. Dialogue between project participants will be a crucial component of each session and is expected to occur with increasing frequency. Five general categories of training will be conducted.

a. Basics of business plans.

b. Financial and credit management

c. Facilitation of groups and networks.

d. Policy and government assistance.

e. Emerging markets and market strategy.

4. Network building. Agents and farmer/entrepreneurs will be provided continuing assistance from their state coordinator throughout the project to develop networks at three levels. Enterprise-specific networks will be established to meet particular needs of each enterprise. Two types of state-level networks will be established: networks of farmer/entrepreneurs and networks of facilitators and service providers. A third level will be regional and national networks for cross-fertilization of ideas across state and market boundaries.

5. North Dakota Marketplace visit. To obtain first-hand knowledge, state representatives of the project will attend the yearly "Marketplace" event in Bismarck, ND, which helped catalyze value-added diversification in the Northern Plains and has already been copied in Northern states.

6. Institutional buy-in from all states in region.

7. Compile and integrate training materials, information on enterprises and resources available in all three states.

8. Training entrepreneurs in presentation of their business so that it will be highly evaluated by rural credit providers, SBDC staff and others crucial to success.

9. Establish a Delta Marketplace of Ideas to showcase existing successes and the many opportunities for agricultural entrepreneurs in the Delta.

Both the classes and the displays will help to multiply the training received by initial project participants.

10. Establish a virtual Marketplace as part of www.deltanetwork.org. Each enterprise will have a page on the website as well as links to web pages and email addresses of relevant service providers.

11. Establishment of a directory and central clearinghouse.

12. Development and distribution of training protocols, materials and notes.

Participants knowledge of potential business partners

	Know entrepreneurs	Know agribusinessmen	Know ag entrepreneur to partner with
Yes	82 %	73 %	31%
No	8 %	17 %	57 %

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-35
Progress Report
December 1998

Integrated Strategic Plan for Sustainable Agriculture

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SARE grant **$25,740**

Objectives

1.) To establish goals, objectives, standards and guidelines to develop sustainable agriculture in the College of Agricultural Sciences of the University of Puerto Rico.

2.) To design and develop an initial Integrated Strategic Plan for Sustainable Agriculture (ISPSA).

3.) To motivate the integration of the three units of the College of Agricultural Sciences by creating a team to design and develop the ISPSA. The team will include representatives from the teaching, research and extension groups at the College of Agricultural Sciences.

Approach

The University of Puerto Rico College of Agricultural Sciences (UPRCAS) initiated last December the development of its "Integrated Strategic Plan for Sustainable Agriculture". The Dean of the College of Agricultural Sciences designed a team of ten faculty members to lead the development of the strategic plan. This team, led by Dr. Hipolito O'Farrill-Nieves, includes representatives from the teaching, research and extension groups at the College of Agricultural Sciences. This team has been called the Committee for Sustainable Agriculture (CSA). A graduate student specialist in planning was brought in to the SCS, a move that has been very useful to the strategic planning process. Also, the recruitment of this graduate student has initiated linkages between the College of Agricultural Sciences and the UPR Planning School.

Two scientists nationally known for the expertise in areas related to sustainable agriculture participated in our strategic planning process in 1998. These are Dr. Aref Abdul-Baki, plant physiologist from the Agricultural Research Service, USDA, Beltsville, Maryland, and Dr. Francis A. Francis, professor of agronomy and director of the Center for Sustainable Agricultural Systems at University of Nebraska-Lincoln. Dr. Abdul-Baki visited the UPR College of Agriculture on March 16-18, 1998, and presented the seminar "Advances in Sustainable Agriculture: Research and Perspectives". Dr. Charles A. Francis visited Puerto Rico on April 21-25, 1998, and presented the seminar "Agroecology and Sustainable Agriculture {El Diseno Agroecologico de una Agricultural Sustentable}." Both scientists had the opportunity to interact with the CSA, the faculty of the UPRCAS, county agents, and farmers. Dr. Francis also helped conduct a roundtable discussion on the concept of a center for research and education in sustainable systems.

The CSA, with the assistance of Dr. Abdul-Baki and Dr. Francis, has selected the preliminary goals, objectives and action plan for our Integrated Strategic Plan for Sustainable Agriculture. During the last quarter of 1998, the CSA will be refining the first draft of the strategic plan. The initial program focuses on building a cooperative program among the units of the UPRCAS, cataloguing the available practices and information relevant to sustainable agriculture, and setting up a series of pilot or demonstration sites that will be valuable for education. These sites will be useful for graduate student research, as well as for extension. They will represent different ecozones and alternative approaches to food production, important with the highly varied local situations that represent the reproductive potential of Puerto Rico.

The first draft of the strategic plan will be used as a guide to receive the input from farmers, county agents, NRCS, Puerto Rico Department of Agriculture, and other stakeholders of the UPR college of Agricultural Sciences. The stakeholders will participate in the strategic planning process during the first quarter of 1999. The final draft of the strategic plan will be distributed among the whole faculty of the UPRCAS for comments, although all of them will be invited to participate of the meetings with the stakeholders of the UPRCAS. The final version of the Integrated Strategic Plan for Sustainable Agriculture of the University of Puerto Rico College of Agricultural Sciences will be presented to the faculty and stakeholders during the last quarter of 1999. It will be presented to Southern Region SARE in October, 1999.

SARE
Sustainable Agriculture Research and Education
Southern Region

ES97-36
Progress Report
December 1998

Sustainable Agriculture Training Initiative for Texas

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SARE grant **$70,136**

Objectives

Extension agents, NRCS personnel and other agricultural professionals will be able to explain the concept and encourage their clients to consider the environmental and social consequences in addition to economics when making farm decisions.

The Texas Agricultural Extension Service and the Prairie View A&M University Cooperative Extension Program, other agricultural and natural resource agencies, and alternative agricultural producers will increase communication and strengthen their working relationships to expand the concept of sustainable agriculture in Texas.

Approach

An extension assistant for sustainable agriculture was hired in Feb., 1998, and an office was established on the Texas A&M University Campus. The extension assistant has been an important participant in organizing the meetings, developing evaluation forms, and maintaining a calendar of sustainable agriculture activities. She is also working on the display for trade shows, and we expect it to be ready in time for the Texas Organic Growers Marketing Meeting in January, 1999. This office is being made available as a source of information on sustainable agriculture for the state.

All county agents in five of the twelve districts have received the training in fundamentals of sustainable agriculture. This consists of a two-hour program, which includes: a written survey of their knowledge and attitudes about sustainable agriculture, an explanation of the definitions of sustainable agriculture, an introduction to resources about sustainable agriculture, and presentation of a video about producers in Texas who are actively working towards sustainability. The resources presented are our website, and introductory material about alternative agriculture groups. The video was made by visiting and interviewing farmers and ranchers in Texas who are using alternative methods, including organic practices, composting, alternative enterprises, and/or holistic management. During the training programs, agents have asked questions about the concepts presented and the relevance to their counties. Several have asked for information on SARE producer grants. Training programs in five of the remaining districts are scheduled for Nov.-Dec., 1998, and the other two will be scheduled soon.

The Texas Sustainable Production Systems website has been expanded to include publications by Texas Extension and Research Faculty as well as links to websites with sustainable agriculture information. The average number of hits per day on the site rose from 18 to 31 from Oct., 1997 to April, 1998. The web address is: http://sustainable.tamu.edu.

We have met with representatives of the state office of NRCS, provided them with an outline of our activities, and invited their employees to all our programs.

A regional workshop, "Developing East Texas Sustainable Agriculture Systems for the 21st Century", held in Tyler in July, 1998, was organized by members of the Sustainable Agriculture Team. Over 50 extension and NRCS personnel and producers attended the presentations, discussions, and tour. Presentations and tour stops covered sustainable practices in dairy, forestry, composting, vegetable crops, and marketing. Invited speakers from out-of-state include Lorraine Merrill of New Hampshire and Dr. William Heffernan of Missouri. A panel discussion included representatives of the Texas Organic Growers Association, Holistic Resource Management, and Heifer Project International.

SARE
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Southern Region

ES98-37
New Project
December 1998

Oklahoma Master Woodland Owners program

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SARE grant $23,640

Objectives

1.) Identify, through a nomination and screening process a cadre of opinion leading non-industrial private forestland (NIPF) owners who are willing to attend 10 educational sessions on advanced forest management at no cost, in exchange for agreeing to spend an equivalent amount of time (approx. 100 hours) in forestry and wildlife management diffusion activities in their communities. Also, county extension educators with an interest in forestry and/or wildlife management will be invited to enroll (several have already expressed an interest in participating).

2.) Conduct 10 educational sessions on topics of forest and wildlife management for NIPF owners and county extension educators.

An array of scientifically-based forest management demonstration sites on NIPF lands throughout eastern Oklahoma will be created by participating NIPF owners. Such sites can then be used by professional foresters, extension educators and opinion-leading landowners as outdoor instructional sites for other NIPF owners, youth, and the general public.

Monitoring of forest management practices adopted, diffusion activities and time spent in such activities, number of people impacted, and acres impacted will be accomplished.

Approach

The Coverts/Master Woodland Owners genre of cooperative extension educational outreach programming has become a marquis of extension forestry and wildlife outreach efforts in a number of states. Project goals are to: (1) facilitate the creation of an array of scientifically-based forest management demonstration sites on non-industrial private forest (NIPF) lands throughout eastern Oklahoma that can be used by professional foresters, extension educators and opinion-leading landowners as outdoor instructional sites for other NIPF owners, youth, and the general public; (2) train a cadre of private forestland owners in outreach skills and conflict resolution such that they can assist professional foresters and county extension educators in having a positive impact on debates over natural resource issues in communities, and (3) increase the knowledge, skills, and abilities of county extension educators and opinion-leading private forestland owners in the scientific disciplines of forestry and wildlife biology.

The target audiences of this project will be community leaders (who own forest land) and county extension educators. The program will utilize a mixture of classroom instruction flavored strongly with audio-visual aids, field demonstrations and exercises, expert guest speakers, role-playing, and self-directed learning opportunities. Ten sessions will he held, spread over 12-15 months. Each session will consist of an evening program (7:00 p.m. -10:00 p.m.), followed by either a half-day of classroom activities and a half-day of field activities or a full day of field activities (e.g., tours, demonstration sites, and/or practical individual or group field exercises).

We expect that each individual will, at a minimum, perform in-kind outreach activities (tv/radio appearances, article writing, assuming community leadership positions on local boards, creating demonstration sites and holding demonstration field days) equivalent to the number of hours (100) that person spent in the Master Woodland Owner training program. Results will be evaluated using pre and post test survey instruments to determine increases in knowledge, skills, and abilities of science-based forest management, amount of time spent diffusing information in the community, number of people impacted, and number of acres of forestland impacted.

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Southern Region

ES98-38
New Project
December 1998

Motivating Teams for Enterprise Facilitation

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SARE grant **$96,000**

Objectives

1. Create a social infrastructure for development of sustainable agricultural enterprises.

2. Develop agents' skills in enterprise facilitation.

3. Develop a mechanism for self-sustaining multiplication of enterprise facilitation skills.

Approach

Environmental degradation, poverty and dependence on least cost commodity production are tightly intertwined in the Delta. Potential solutions can be closely linked since farmers most quickly change their practices in response to market opportunities and the most profitable markets require value-added processing which creates jobs. Extension, NRCS and USDA/Rural Development staff are well-positioned to facilitate new enterprises which are both ecologically and economically sound. Representatives of all these agencies, and Delta non-profit staff have participated in a planning process with Delta farmer/entrepreneurs to determine training needs in enterprise facilitation. This process has resulted in a project design focusing on pairs of agents and farmer/entrepreneurs which will include a combination of formal and experiential training and directed dialogue with other participants. A regional "Delta Marketplace of Ideas" will be held in November 1999 to help the agents and farmers multiply this training more widely in the Delta and promulgate enterprises arising from this project and enterprise ideas from other SARE projects.

In the few weeks since the project officially began, the key accomplishment was organization and beginning recruiting participants for the project's first conference: "Entrepreneurial Agriculture for the Delta". Based on initial response, we expect over two hundred farmers, agribusinessmen, researchers, educators, bankers and legislators from the seven Delta states will gather to discuss the topic: Understanding trends in rural opportunities in order to jump-start value-added marketing and diversification in our region.

Based on several planning meetings, we have determined that events on the following topics will be most useful to participants.

First a get-acquainted mixer/reception will be held so participants can get to know each other. This will be hosted by Les Wyatt, president of Arkansas State University.

The first event on the actual day of the conference will be the "Delta Futures Breakfast" hosted by Rep. Marion Berry. This event will include a presentation: "Trends for Agriculture in the Delta" by Ronald Milbach, President/C.E.O. Federal Land Bank and Production Credit Association of Southeast Missouri.

A plenary discussion will occur on "Generating alternatives in Delta agriculture: the missing ingredient" with introduction and moderation by Richard Parry, USDA/ARS and three perspectives: presented by Dan Kugler, Associate Administrator, USDA/CSREES; Shelby Thames, University of Southern Mississippi; Bill Patrie, North Dakota Association of Rural Electric Cooperatives.

We have determined that six key topics in sustainable rural development should be examined in workshops led by agribusinessmen and rural development staff from all states in the region.

These will include:

- Potential Emerging Markets
- Basics of Rural Enterprise Development: Planning, equity, access to Capital
- Stimulating Entrepreneurial Spirit in Agriculture
- Access to capital: Local lending for entrepreneurial agriculture projects?
- Growing New Delta Markets sion.
- Mentoring/Research

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Southern Region

ES98-39
New Project
December 1998

Multi-Disciplinary Training on Pasture-Based Dairy Systems

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SARE grant $52,578

Objectives

The objective of this program is to provide the impetus for the adoption of pasture-based dairy farming in the Mid-Atlantic region. To accomplish this there are three components:

A. Knowledge will be gained of pasture based dairying practices at research stations and on dairy farms in Ireland and this knowledge will be adapted and implemented on farms in the Mid-Atlantic region. Extension educators, other professional and farmers will learn new ideas and practices which can have positive impact on work and quality of life for dairy farm families in the Southeast.

B. Attitudes among agricultural professionals about the possibilities of pasture-based dairying will be changed. Participating professionals and farmers from the Mid-Atlantic region will be trained and will offer educational programs to provide information and support the adoption of sustainable pasture-based dairy production systems.

C. Innovative farmers and advisors will meet on a regular basis to discuss sustainable alternative dairy management practices and solve problems.

Approach

This training project is a partnership among three states, North Carolina, South Carolina and Virginia, and among farmers, county extension agents, U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) workers, and university specialists. Milk production in the Southeast is declining and livestock waste regulations are getting stricter.

Pasture-based production systems are potentially more profitable and more environmentally sound than confinement dairy systems. Significant shifts to pasture-based systems will be dependent upon dairy industry professionals learning about management and economic opportunities of such systems. Training will incorporate local data as well as relevant information from established pasture systems from Ireland. Family dairy farming in Ireland has used pasture for many years, backed up by work at world class research institutions. A multi disciplinary fact finding mission to Ireland will help us learn intricacies of their pasture systems. Working sessions will be held to review and selectively integrate pertinent local and Irish information into training materials, and to develop training and education programs.

Three in-depth "train the trainer" schools will be offered, one each in VA, SC, and NC. This initial audience consists of extension agents, NRCS workers, farm supply consultants and selected farmers. Additional programs for farmers will include meetings, workshops, field days, and the establishment of "local" farm discussion groups. All of the fact finding team will assist with educational activities.

Dairy farming in the Mid-Atlantic region can become more sustainable based on increased understanding of economic, environmental, and quality of life benefits of pasture-based feeding systems. Pasture-based dairying should be attractive to young farmers and to producers relocating from other regions because of lower capital investment than confinement dairying. Program impact will be measured by: participation in educational activities; pre- and post-training surveys to assess changes in knowledge and attitudes; and increased use pasture-based dairy feeding programs in the region.

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ES98-40
New Project
December 1998

Grazing Management Training to Enhance the Sustainability of Pasture-Based Beef Production

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SARE grant **$31,745**

Objectives

The objective of this program is to provide training support to farm agency advisors and livestock farmers who want to learn more about economical, environmental and socially sustainable farming systems.

A. Participating professionals will be trained specifically in pasture/livestock management so that they can offer educational programs and provide information and support to farmers who want to adopt sustainable and environmentally sound pasture-based livestock production systems.

B. Selected farmers and farm advisors will organize educational activities and regularly meet on farms to discuss sustainable livestock management practices and solve problems.

Approach

Thousands of small livestock farms in the Southern Region play a significant role in the stability of rural families and communities. Many of these farmers manage significant amounts of manure nutrients from confinement animal operations on sloping and erodible land that is best suited to permanent grassland or forest; management decisions impact profitability and environmental quality. This training project will focus on helping farm agency workers (within and outside of NC) and farmers develop a sustainable approach to pasture-based livestock management. We propose to conduct six different 2-day training schools and reach 80 agency workers and 128 farmers. We will develop a very detailed Training Module for several subjects that can be used in classroom and field exercises. Most of the subject matter discussions will be video taped and edited so they can be used for follow-up educational programs in community meetings. All training materials will be available to workers in the Southern Region. There will be one "advanced" training class for 20 Agency workers and eight farmers who want to become Master Grazier. Master Graziers will be volunteers who want to help agency workers with educational activities in their respective communities. Program evaluation will come from measuring attitudes and knowledge pre and post training, participation in community discussion groups, demand for training modules, and requests for Master Grazier training. The ultimate documentation of success will come through monitoring accomplishment reports of the USDA agency workers.

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Southern Region

ES98-41
New Project
December 1998

Training in Value-Added Syrup Crops

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Cooperators
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Mississippi Department of Agriculture and Commerce

Mississippi CES

Mississippi Agriculture and Forestry Exp. Station

Mississippi State Fair Commission

Mississippi Agriculture and Forestry Museum

Neshoba County Fair Commission

Syrup Producers in Mississippi, Louisiana, and Alabama

Southern University CES

Auburn CES

Mississippi Center For Cooperatives

Syrup Crops Advisory Committee

SARE grant $99,912

The production of sweet sorghum for syrup in the United States dropped to 2.2 million gallons in 1959 and to 1.9 million gallons in 1960, the last date of data collected by the United States Department of Agriculture. The production of sugarcane for syrup dropped to 3.6 million gallons in 1960 and to 2.6 million gallons in 1969, the last date data was collected. These cash crops have continued to decline as indicated by a 14 county extension survey in Mississippi by 1995 of 31 acres of sweet sorghum and 70 acres of sugarcane and in 1997 of 14 acres of sweet sorghum and 48 acres of sugarcane. In Mississippi this decline has been due to non-sustainable complex practices of production, harvesting, processing and marketing.

There is a long list of problems given by producers of which excessive labor, reduced yield, winter kill, very low market prices, few and poorly equipped processing plants, and poor quality syrup are frequently cited. Even though the gross returns for sweet sorghum and sugarcane for syrup are in excess of $1500.00 and $2,500 respectively, and even though the Alcorn Cooperative Extension Program has conducted several total practice production demonstration in years past, the industry has not blossomed to its' full potential. A systems approach to the total industry, including training for producers, educators and researchers is a must.

This project will provide on-farm demonstration of sustainable production and harvesting practices and highly visible public demonstrations of sustainable processing and marketing practices. Mobile harvesting, juice extraction, syrup processing and marketing equipment, called the Mill On Wheels, is available from Alcorn Cooperative Extension Program and will be utilized in this project. During demonstrations, producers, professionals and the general public will attain hands-on training in an integrated systems approach to sustaining a value-added agriculture product. Producers will be shown how to apply for SARE Producer Grants to address the syrup crop problems. Successes of systems will be promoted by reports, publications, news articles, slide programs, videos, displays at public events and e-mail discussion groups.

Objectives

The main objective is to demonstrate a systems approach through which to train producers, educators, and researchers in the syrup industry so as to sustain sweet sorghum and sugarcane syrup production, harvesting, processing and marketing, and to make a significant contribution to rural development and building of rural social capitol.

This is a total systems approach project, dealing with applied research/demonstration as an educational tool to reach small, low income and socially disadvantaged farmers and revive the sweet sorghum and sugarcane syrup industry. This project seeks to sustain syrup production on small farms by establishing sustainable production, harvesting and processing methods through appropriate technology, researching consumer syrup preference, product development and demonstrating the processing operation as entertainment/point of sale marketing. Further, this project will encourage development of new products from these crops, ie.; sorghum cider, sugarcane cider, pasteurized juice, juice blends; watermelon/sugarcane, muscadine/sugarcane, syrup blends; sweet sorghum/corn syrup, sugarcane/corn syrup, sweet sorghum/sugarcane syrup, watermelon/sugarcane syrup, compost/mulch of baggas by product and other products that could utilize the processing facility and enhance marketing through out the year.

During the first year of the two-year project, the Mill on Wheels mobile processing plant, demonstrations, applied research, and training will be evaluated. The objectives/goals and activities will be initiated, evaluated, and enhanced. The first year will introduce revival of the syrup industry to Mississippi, the second year will strengthen the Mississippi industry and introduce at least one county in two additional states (Alabama, Louisiana) to sustainable syrup systems training.

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Sustainable Agriculture Research and Education
Southern Region

ES98-42
New Project
December 1998

Training in Agriculture Program (TAP)

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SARE grant **$17,890**

The goals of Operation Spring Plant's Training in Agriculture project is to explore plant and animal sustainable agriculture training subjects, training facilitation venues, and training delivery systems that will benefit the limited resource, minority farmer in the Region K area of North Carolina. The development of a viable training system for limited resource, minority farmers will enhance the region's environmental quality and natural resource bases. Exploration of sustainable agriculture training needs in the areas of rotational grazing, production of greenhouse starter plants, leafy green vegetable planting and harvesting, and development of market outlets and farmer cooperative organizations will be a major focus of the TAP project. Network linkages will include coordination and collaboration with North Carolina State University, North Carolina Central University, and A&T State University. Additional linkages will be developed and strengthened with Cooperative Extension, interrelated human service organizations, community based agencies, food and grocery store chains, community colleges, public schools, and the community of limited resource, minority farmers.

Objectives

1.) Identification and implementation of training facilitation avenues to benefit the limited resource, minority farmer:

GOAL: Identify areas of sustainable agriculture training needs

OBJECTIVE: Fifteen limited resource, minority farmers will be identified in one or more of the targeted service counties, i.e. Warren, Franklin, Person, Granville, and Vance. The technique of focus group meetings and quick response surveys will be implemented in order to document training service needs. Contact will be made with representative agriculture agencies/institutions, related human service agencies, and local area grocery chains to determine needs as they relate to applicable areas of expertise in meeting needs through training.

GOAL: Based on training assessment outcomes, identify/list five (5) major areas of sustainable agriculture practices

OBJECTIVE: Information and results of focus group meetings, surveys, and farm visits on the fifteen selected study farms will be compiled. Data collection will be comprised and documented of the following main elements: (1) Farm Type, Acreage, Soil/Facilities, and Location, (2) Farmer Characteristics, i.e., education, income levels, and family size, (3) History of Two-Year Crop/ Livestock Production, (4) Current Condition of Farm Status, (5) Best Methods for Training Delivery, (6) Overcoming Barriers to Training, (7) Defining Training Accessibility Issues, (8) Training Feasibility and Identification of Training Locations.

GOAL: Compile a data resource bank on area training resources

OBJECTIVE: Conduct a quick response survey mailing to area and regional agriculture and interrelated agencies and institutions on availability of training resources and training facilitators. Connect participating agencies and institutions. Develop resource sharing partnerships to amass training materials, equipment, printing, avenues for training certification, and awards for training completion.

GOAL: Improve capacity building techniques

OBJECTIVE: OSP staff and selected volunteers will participate in and attend national, regional, state, and local sustainable agriculture forums, meetings, and conferences. Develop training avenues for staff to improve abilities and receive certification in required sustainable agriculture methods.

Producer Project Summaries

SARE
Sustainable Agriculture Research and Education
Southern Region

PG95-21
Final Report
December 1998

Pecan IPM Using Black-Eyed Peas as a Trap Crop

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SARE grant **$4,000**

Stinkbugs occur throughout the South and cause kernel damage to pecans in all pecan growing states. In Texas, most stinkbug damage occurs August through November when stinkbugs move from nearby crops and weeds. Stinkbugs cause a direct loss of three to five percent of the economic returns from southern region pecans, although losses within individual orchards can reach 40 to 50 percent.

Using their needle-like mouthparts, stinkbugs pierce the pecan shells and feed on the maturing kernels. The resulting damage is a dark, sunken, bitter-tasting spot on the pecan kernel (kernel spot). Farmers are not paid for stinkbug damaged kernels.

Preliminary information suggests that small plantings of black-eyed peas in pecan orchards can help pecan growers manage stinkbugs. The bugs are attracted to the black-eyed peas on which they feed preferentially, reducing pecan kernel damage. The grower's goal was to utilize the trap crops in one or more of four ways. They first used the trap crops to monitor populations of stink bugs (it is much easier to sample black-eyed peas than pecans). Second, they used the trap crops to attract and hold the stink bugs, thereby preventing nut damage. Third, if large numbers of stink bugs were found, the growers could spray the trap crop. By not spraying the trees, the growers would avoid creating the secondary pest outbreaks of aphids which commonly occur when broad spectrum insecticides are used on pecans in West Texas. Lastly, if stink bug populations in the orchard reached numbers at which high levels of kernel damage were imminent, they could spray the trees, using the population levels in the trap crop as a decision making tool.

Approach

The growers used two orchards in this study. In the first, southern pea trap crops were established on about 1.5 percent of a 650 acre irrigated orchard. The second orchard, 20 miles north of the first, was not planted with trap crops and was used as a control.

Each year, scouts sampled the pea trap crops on a regular basis with a standard (15-inch hoop) sweep net to determine stink bug species, infestation levels and population changes. They used this information to make management decisions on insecticide application.

At harvest, 100 samples of 20-22 nuts were taken at various distances from the trap crops to assess the activity and success of using trap crops to protect pecans from stink bug damage. Farm-wide levels of stink bug damage were estimated by pooling these data.

In 1994, eight cowpea trap crops of two rows with two beds/row (about five acres total) were established at 800 to 1,200 foot intervals. They were planted between the tree rows, ran the same length as the tree rows and were planted on July 19 and August 1. Sweep net samples were taken on September 12, 20, 23, 27 and October 7, averaging 2500 sweeps/sampling date (range 1,600 to 3,300). The growers applied no pesticides to either the pecans or the trap crops as a result of the sweep data.

The growers sampled pecans on October 21 and October 27 by taking approximately 100 nuts at 22 locations (total of 2409 nuts). They took four replications of 100+ nut samples at 0-10 feet, 90-110 feet and 290-310 feet from the cowpeas to assess how distance from the trap crop affected stink bug damage. Another set of samples were taken from 0-10 feet to 2000 feet from the cowpeas. They examined the sample nuts for evidence of stink bug damage.

In 1995, nine pink-eye purple-hull pea trap crops of 4 rows with one bed/row (about 10 acres total) were established at 800 to 1,200 foot intervals in the first orchard. The plantings were again established for the length of the tree rows in between the rows. The trap crops were planted on August 1 and 10. Sweep samples were taken on August 28, September 5, 11, 19, October 2, 9, 16 and 27. An average of 2255 sweeps were taken per sampling date (range 1,900 to 2,900). Using the sweep data as the basis for treatment decisions, no insecticides were applied to the trap crops or the trees.

The growers took nut samples from the trees planted with trap crops on October 31, November 10 and 18. Twenty samples of approximately 100 nuts (total of 2, 065) were taken. The growers took six samples at 90 to 128 feet, six samples at 290 to 317 feet, and two samples at 619 to 620 feet from the trap crops. As they did in 1994, they examined the nuts for stink bug damage.No differences in stink bug damage to pecan kernels were observed 0, 100 and 300 feet from the trap crop plantings in either 1994 or 1995. The growers did note a trend toward increased

damage at 600 feet from the tree rows.

The growers noted strong reductions in stink bug damage when comparing the orchard with trap crops to the orchard without trap crops. In 1994, the trap cropped pecans sustained only 70 percent of the damage sustained by the non trap cropped pecans. In 1995, a year with low stink bug problems in the region, the trap cropped pecans sustained 91 percent of the damage of the non-trap-cropped pecans.

The cowpeas used in the 1994 study performed well. They maintained good growth, leaf color, flowering, and pod set for 45 days. The pink-eye purple-hull peas used in the 1995 study were chlorotic (yellow) in spite of an expensive iron treatment. They demonstrated poor growth, blooming and pod set and were a poor choice for a trap crop planting in west Texas.

Results

When the growers compared the average dollar losses from stink bugs between the trap cropped sites and the non- trap-cropped sites they found that the non-trap-cropped sites sustained $29.29 more stink bug associated losses than did the trap-cropped orchards. It cost the growers approximately $2,112.50 (about $211.25/acre of peas) to establish and maintain the trap cropped peas. When spread over the 650 acres of the pecan farm being affected by the presence of the trap crops, the growers spent $3.25/acre (of pecans) to establish and maintain the trap crops. The growers determined for every dollar they spent establishing and maintaining the trap crops, they prevented $9.01 in kernel damage from stink bugs.

Outreach

At project completion, results were presented at the Texas Pecan Growers Association meeting, the Permian Basin Pecan Conference, and to the Southwestern Irrigated Pecan Growers.

SARE

Sustainable Agriculture Research and Education

Southern Region

PG95-25
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December 1988

Development of Potting Soil Mixes from Local Wastes

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SARE grant $9,600

Almond Tree/South Dade Nurseries in Dade County, Florida, required a financially and environmentally sound substitute for the potting soil mix currently in use: a mixture of peat, pine bark and sand. Peat is expensive and depletes a natural resource that could be saved if a good quality substitute can be found.

Objectives

1.) Develop a potting soil mix from composted organic materials, including sewage sludge and organic waste products that have been source-separated from the rest of the refuse stream and are currently going to landfills and incinerators.

2.) Evaluate the potting soils for fertility, moisture rentention and performance in a greenhouse setting.

Approach

The producers grew four varieties of nursery stock (green buttonwood, silver buttonwood, gumbo limbo and Christmas palm) in containers filled with the professional potting mix and also in containers filled with composted yard waste. The composted yard waste came from a nearby municipality, which screened it for non-yard waste materials prior to delivery. All of the plants in both sets of containers were fertilized identically with 16-4-8 fertilizer and also received the same amounts of water. A pre-emergence herbicide was applied equally to both sets.

Results

After one year, the plants grown in the composted yard waste performed as well as those grown in the professional potting mix. Furthermore, the professional potting mix cost $21.28/cubic yard while the composted yard waste cost $15.00/cubic yard. The producers now use their own potting mix in their nursery.

Outreach

Field days, seminars and mailings were used to disseminate information on the new potting mix.

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Sustainable Agriculture Research and Education
Southern Region

PG95-26
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Testing the Efficacy of Alternative Methods of Whitefly Control in Organic Vegetable Production

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SARE grant $5,200

Whiteflies, including the sweet potato whitefly, the silverleaf whitefly and the greenhouse whitefly attack a broad range of economically important vegetable and field crops, and have recently increased in importance in the western and southern United States. Whiteflies damage crops by feeding on plant sap. More importantly, whiteflies are capable of transmitting viruses to a wide range of crops.

Biogeographic surveys of whitefly populations from 1989 to the present indicate that whiteflies inhabit nearly every major agricultural locale in the southwestern and southeastern states and Hawaii. Economic crop losses due to whiteflies and their associated viruses have been especially significant in Florida, Georgia and South Carolina. An important factor responsible for the whitefly's prevalence in agricultural areas is its ability to feed, multiply and survive on an extremely wide range of host plants.

On their certified organic farm in Florida, the producers observed large whitefly populations during the entire cropping season. They experienced nearly 100 percent virus infection of snap beans and tomatillo. Overall, the viruses transmitted by whiteflies are their largest production problem.

Pesticide application is the most common method of whitefly control on conventional farms. However, organic farmers interested in alternative approaches have more limited methods available for whitefly control. In this research project, the producers will conduct an on-farm experiment to determine if an economically feasible control program utilizing an integrated pest management approach can be developed for small to medium-size farms.

Objectives

1.) Determine if the use of reflective mulches under beans is an effective means of whitefly control.

2.) Determine if intercropping beans with squash is an effective means of whitefly control on beans.

Approach

The plot size is 10 feet long with four treatments/plot. Each plot is replicated four times giving a total of 16 treatment-replications. The producers are comparing both the number of whiteflies and the percentage of virus infection on beans planted under the following treatments:

1.) beans planted on bare soil,

2.) beans planted on plastic mulch,

3.) beans intercropped with squash and planted on bare soil,

4.) beans intercropped with squash and planted on plastic mulch.

The squash is utilized as a trap crop planted with the beans because squash is very attractive to whiteflies. The beans were inspected for symptoms of viral infection on a weekly basis. Whiteflies were sampled once a week in the early morning when they were less active. At maturity, all of the bean plants were harvested and weighed for each treatment.

Results

Reflective mulch may be more effective at deterring whiteflies early in the season before it becomes soiled or shaded by growing plants. It also was more effective when the whitefly populations were low to moderate; when the populations were high the reflective plastic mulch was less useful. The reflective mulches did help with soil moisture and weed control and by reducing nitrogen volatilization.

The squash served as an effective trap crop for whitefly when the populations were low to moderate. However, when the whitefly populations were high, the squash plants were still an attractant but the beans were also covered with whiteflies.

Outreach

Project results will be submitted to agriculture and plant pathology journals and papers presented at the Florida Plant Pathology Society or the Florida Entomological Society. The producers held a field day for local growers, Extension workers and master gardeners.

SARE
Sustainable Agriculture Research and Education
Southern Region

PG95-28
Final Report
December 1998

Improving Tropical Soils by Using Organic Wastes

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Tropical Sources

Ama a tu Gente Salva el Ambiente

SARE grant $10,000

Lake Carite in Puerto Rico is surrounded by forest and farmland. The farmers utilizing the land surrounding the lake grow citrus, coffee, bananas and some annual crops. Some of the fertilizers and pesticides used by the farmers leach into the lake. In many tropical ecosystems, nutrients are held in the standing biomass and not in the soil. When the natural vegetation and nutrients are removed from the site, the fertility of the bare soil is low. In the absence of protection, the topsoil erodes, and the remaining soil does not respond well to fertilization. Consequently, the citrus crops are not responding to traditional fertilizer recommendations and fertilizer use is increasing. The local fruit processing plant and poultry farm near the lake have waste disposal problems. The project seeks a practical solution to the plants' waste disposal dilemma and to the farmers' soil fertility problems.

Objectives

1.) Construct compost piles primarily of fruit waste and poultry manure with seaweed, sand, calcium carbonate and leaves.

2.) Demonstrate to area farmers how to build compost piles.

3.) Demonstrate to area farmers how to use compost to increase organic matter in their soil.

Approach

The compost piles are housed on a demonstration farm in wire-mesh sided structures with concrete floors and tin roofs. The piles are turned regularly. Temperature, humidity and pH are monitored in all the compost piles on the demonstration farm to ensure adequate composting. These compost piles will be used as controls against which the performance of the compost piles of the participating farmers' fields will be compared. In this way, a participating farmer's compost pile can be adjusted and improved to obtain a better compost. There are many farmers participating in the project, both from the area and from surrounding counties.

Results

In addition to obtaining fruit waste and poultry manure from local sources, the project coordinators also purchase cow manure because they have learned it is helpful to keep a large stock on hand for the project. They have also found that the addition of seaweed increased the nutrient content of the compost. The compost piles constructed in the bins on the demonstration farm take nine weeks to mature. On some of the participating farms the compost piles produce fully useable compost after 12 weeks. The differences are likely due to composition and size of the piles and air temperature due to elevation. In all cases, the piles are turned every 20 days. Mature compost has been applied to citrus trees, used as a potting medium for nursery trees and as a soil amendment in vegetable gardens. The cooperators report that when the compost is applied to citrus trees, chlorosis was corrected, and the general appearance of the trees improved.

Outreach

Farmers are invited to attend workshops about composting through notices posted in local extension and NRCS offices. The cooperators have held more than 20 workshops for area farmers. The average attendance has been 12 with up to 30 people attending some workshops. Farmers who cultivate fragile land on the lake shore have been visited by project participants who tell them of the project and how they can benefit from it. The cooperators demonstrated composting to 200 people at an Earth Day gathering. They have received invitations from groups in other counties requesting demonstrations on compost pile construction. With the help of cooperating agencies, printed material has been produced covering composting and organic farming methods.

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Sustainable Agriculture Research and Education
Southern Region

PG95-33
Continuing Project
December 1998

Cover Crops in Integrated Vegetable Production Systems

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SARE grant $9,285

Lexington County, South Carolina is a major vegetable producing area. Around 4,000 acres of collard greens, green onions, squash, tomatoes and beans are produced annually. Cover crops are needed to reduce soil losses and improve soil conditions. The current vegetable cropping systems used on much of the land in the county contribute to the loss of seven to eight tons of soil per acre annually. The soils are deep and sandy, requiring high irrigation rates. Because of this, high rates of nitrogen are applied and lost.

Winter cover crops could be used to reduce erosion. Cover crops would also reduce nitrogen losses (by using a nitrogen-fixing species less nitrogen fertilizer would have to be applied), improve organic matter levels, soil texture, soil structure and water-holding capacity. Cover crops can potentially control certain diseases through their place in a rotation, but some studies have indicated that the incidence of root-knot nematodes and diseases caused by *Pythium* and *Rhizoctonia* can increase following certain cover crops.

The producer will test treatments of the cover crops: rye, oats, rye + crimson clover, rye + cahaba vetch, crimson clover, cahaba vetch, hairy vetch, Austrian winter pea, arrowleaf clover and a fallow to control erosion and improve soil fertility. He will determine if any of these cover crops encourage the growth of plant diseases caused by *Rhizoctonia* and *Pythium.*

He will plant the cover crop treatments in a randomized complete block design replicated four times. He will test the soil for pH, nitrogen, physical properties, nematodes and *Rhizoctonia* and *Pythium.* Crop dry weight, N content and disease incidence will be observed and recorded.

Preliminary trials have shown that cover crops can potentially control certain diseases through their placement in a rotation. The incidence of root-knot nematodes have been very low in all the cover crops. Preliminary observations also indicate that *Rhizoctonia solani* counts in all cover crop treatments have decreased. However, *Fusarium* counts have increased slightly over the life of the project, but the analyses to separate the counts of pathogenic from non-pathogenic *Fusarium* species have not yet been performed.

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Southern Region

PG96-36
Continuing Project
December 1998

Native Warm Season Grasses As Alternative Hay Source to Annual Sorghum/Sudan Grasses on Family-Operated Goat Dairy

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SARE grant **$9,640**

One of the primary reasons for the disappearance of the family farm is the difficulty of maintaining a cash flow. Modern agriculture tends to be cash intensive but produces low profit margins. Consequently, farmers often have to accept a reduced standard of living in order to keep their farms. Under such financial constraints, farmers who would like to practice environmentally sound farming often feel they can't afford to try it.

Farmers are always looking for ways to increase income. One alternative is the use of range land to raise meat or dairy goats. Dairy goats provide an array of products including meat, milk, and cheese. The nature of the dairy goat makes participation in all aspects of the dairy possible by family members of all ages. Unfortunately, few small dairy goat operations survive the first five years.

High labor cost is one of the reasons for the poor survival rates. The labor requirements for dairying in general, and for dairy goats in particular, are high. Approximately 12 goats must be milked to yield 100 pounds of milk, but only 1.5 to 2 cows are needed to produce the same amount.

Paradoxically, families who are willing to make the labor commitment to a small scale dairy operation are often under capitalized. One of the cash requirements for a dairy operation is feed. The producer believes the use of perennial grasses will lower feed costs. Once established, perennials eliminate the yearly purchases of seed, yearly tillage costs, chemical herbicides and replanting expenses. Native warm-season perennials are reputed to require less water and fertilizer than annuals and produce more biomass per acre. Due to deep and extensive root systems they are also believed to be quite drought tolerant.

This producer proposes to lower the cost of feed in order to increase the longevity of her small-scale dairy. She will do this by reducing total inputs and by improving the productivity of the land by using native warm-season perennial grass crops as sources of hay for her dairy. She will determine if warm season perennial grasses that mature at successive dates throughout the season will produce more, and better quality, hay for dairy goats than does the currently used sorghum/sudan cross.

The producer planted a thirty-acre plot of sorghum/sudan grass cross. She planned to harvest it and feed it to her dairy goats. She also planted three 10-acre plots with one of the following warm season grasses respectively; *Tripsacum dactyloides* (eastern gamma grass), *Sorghastrum nutans* (indian grass) and *Panicum virgatum* (switch grass). The three warm season grasses will be harvested as hay (in boot stage) and fed to dairy goats.

The producer will take soil samples from the plots prior to planting and after harvests of all grasses and analyze them for pH, CEC, nitrogen, phosphorus, potassium and some micronutrients. She will take samples from all hay species and analyze them for yield, protein content, macronutrients and some micronutrients.

She has kept records of monthly sampling of percent butterfat, percent protein and total production, of milk from goats fed the sorghum/sudan cross hay for one lactation cycle (one year) and then hay from the three warm season perennials for one lactation cycle (one year). She will also keep records of costs associated with production of hay from all types of grasses.

SARE
Sustainable Agriculture Research and Education
Southern Region

PG96-44
Final Report
December 1998

Alternatives to Chemicals in the Peanut-Cotton Rotation

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SARE grant $9,366

The peanut-cotton rotation is the major production system for many farmers in eastern North Carolina. Cotton production alone increased 40% from 1994 to 1995 up to nearly 800,000 acres in North Carolina. One hundred and fifty thousand acres of peanuts are grown in North Carolina, primarily in 13 counties in the coastal plain.

The production of both peanuts and cotton are chemical intensive and costly. Thirty-three percent of the operating inputs in peanut production go to pesticides. Both peanut and cotton production depend on the use of chemicals which are known or suspected carcinogens.

As growers have looked for ways to improve their cultural techniques, become more efficient, and stay competitive, many have adopted no-till methods of production. Peanut growers did receive some benefits from the switch to no-till production but they had to increase their use of chemicals.

This project investigated the use of beneficial insects, cover crops, and the use of chemical alternatives which are less toxic—and less expensive—than those currently used. For cotton, the grower investigated the use of alternatives to Pix, a growth regulator which encourages the initiation of reproductive growth, and Def, a defoliant used just before harvest. The farmer tried the use of sugar (in the form of corn syrup) to replace Pix, citric acid to replace Def, and beneficial mites and soaps to control thrips. For peanuts, the grower investigated alternatives to the use of aldicarb (Temik), e.g. orthene, which is used for early-season Thrips control.

Approach

Beneficial mites (to control thrips in peanuts) were released in one-third of the experimental areas on the growers farm and the farms of four project cooperators. Soap sprays (to control thrips in peanuts) were used on another third and orthene was used on the remaining third of the experimental areas on those farms. The fields receiving these treatments were monitored for amount of thrips damage and peanut yields.

The corn syrup solution (as a growth regulator) was applied to cotton in the pinhead square stage in experimental areas on the growers farm and the farms of two cooperators. The corn syrup solution was reapplied as necessary. At forty percent open bolls, citric acid solution was applied as a defoliant to cotton in the experimental areas on the project farms. Citric acid was reapplied as necessary.

Results

Due to hot dry weather, the release of mites was not a rousing success; the growers never did come up with an efficient way of applying the mites. The soap spray also had its share of problems. When the pressure was put up high enough to get the soap solution into the bud, it was high enough to frequently blow the bud off the plant. The orthene, however, was a big success. By discontinuing the use of aldicarb, and using orthene instead, they saved an average of seventeen dollars an acre.

In the cotton, both the use of the corn syrup solution and citric acid solution gave encouraging results. Some of the cooperating growers had better success than others. As a result, Hubert Morris has received another Producer Grant to continue his work with the corn syrup solution as a way of shortening the internodes on the cotton and having more energy available for the boles.

Outreach

The Cooperative Extension Service and the NRCS will publish the results of the project in agency newsletters as well as in local newspapers. In addition, they will hold field trips so that interested individuals can view the project. A series of farmer meetings organized by RAFI-USA has included farmers from around the region and were used to disseminate the results of the project.

SARE
Sustainable Agriculture Research and Education
Southern Region

FS97-58
Final Report
December 1998

Evaluation of an Alternative Low-input Production System for Fresh Market Tomato

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SARE grant **$5,109**

The producers determined the feasibility and economic viability of an alternative production system for fresh market tomatoes. The standard production system utilized in the southeastern United States is designed to achieve profitability by maximizing yields. The system depends on the use of methyl bromide which is a powerful soil fumigant that will no longer be allowed to be used after January 1, 2001.

In the conventional system, raised-fumigated beds are covered by plastic mulch and the crop is managed through the extensive use of inputs. This system is becoming problematic, particularly for limited-resource farmers, due to limited availability of suitable land, high preharvest production costs, problems with the disposal of plastic mulch, and the loss of methyl bromide as a soil fumigant.

The project was designed to minimize the impact of soilborne pests, reduce agricultural inputs, optimize profitability and increase participation by limited resource farmers. These goals were accomplished by combining minimum tillage practices with existing bahia grass pasture. This approach permitted the production of fresh market tomatoes on land which had been established for grazing, hay or sod production, without permanently destroying the integrity of the pasture. Access to pasture can foster implementation of sound crop rotation programs which will eliminate the need for broad spectrum fumigants including methyl bromide. This production system utilizes pasture as a natural mulch eliminating the disposal problems associated with the use of plastic mulch. Minimum tillage practices reduce soil erosion, increase soil tilth and conserve organic matter.

Objectives

Produce tomatoes in a bahaia grass pasture which serves as a living mulch and creates an environment hostile to tomato root nematodes.

Approach

Large (3-4 acre) plots were established for the conventional and alternative production systems. The plots were located adjacent to each other. The same tomato cultivar was grown in both plots permitting comparison of marketable yield and fruit quality. Large separate plots allowed for an accurate assessment of labor inputs, material inputs, and packout data.

The bahia grass plots were rotovated and ripped and then fertilizer was rotovated into the soil. Poast was applied on the edges of the cleared strips to keep the bahia at bay during the season. In addition to cultivation and fertilization the conventional plots required laser leveling, deep plowing, fumigation with methyl bromide and mulching with plastic before planting. Inputs on the conventional plots often total $1,000 per acre.

After harvest cleanup included burning the nylon string, pulling up the stakes and mowing the vines before turning the cows back into the bahia pasture. But it was no extra work because these things need to be done anyway.

Reports on the incidence of foliar pests were obtained bi-weekly by a private scouting firm. These reports were used to decide if and when pesticide applications would be made. The cooperators scouted for foliar and soilborne pests at various intervals throughout the crop and for root-galling and nematode populations at harvest. The cooperators also assisted in the analysis, interpretation, and presentation of data obtained in this project.

Results

Thrips caused a twenty percent loss due to tomato spotted wilt virus in the bahia pasture strip-tilled plots compared to a ten percent loss in the conventional plot. Consequently, yield from the bahia grass plot was 1270 boxes/acre versus 1498 boxes/acre for the conventional plot.

Because the input costs were higher in the conventional plot, the producers made more money on the bahia grass plot. The conventional plot grossed $4,719/acre with inputs of $3,800/acre while the bahia grass plots grossed $4,001/acre with inputs of $2,850/acre.

Net profit from the bahia strip-tilled plot was greater than in the conventional plots due to savings on the chemical and labor inputs. The net profit on the bahia grass plots was $1,151/acre which was $232/acre greater than

the net profit of $ 919/acre on the conventional plot.

Outreach

Project information was shared by hosting a field day for area tomato growers. The cooperators produced an extension fact sheet and presented project results at regional grower meetings and scientific conferences.

High-Value, Small-Scale Sustainable Vegetable and Fruit Production Methods

PG95-27
Continuing Project
December 1998

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SARE grant **$9,612**

During the last decade many farmers have gone out of business, in part due to the rising costs of land, machinery, chemicals, fertilizer and seed. Young people are finding it increasingly difficult to make the capital investments necessary to enter farming. The producers will demonstrate that a sustainable profit may be made from as little as two acres and a few purchased organic fertilizers, using no chemicals or large machinery. They will also demonstrate how to improve soil physical properties and fertility through the use of mulches and animal manure.

The producers have created an additional one-acre garden on their farm specifically for this project. They are planting a series of vegetable and fruit crops over three years. The crops are corn, sweet potatoes, cabbage, strawberries, watermelon, cantaloupe and butternut squash. The garden will be divided into four equal sections, and fruit and vegetable crops will be rotated on the sections during the project.

During the first year of the project the growers experienced severe weed problems. The area chosen for the one-acre project garden had not been farmed for a number of years, and the mulches could not control the weeds. The weeds, primarily johnson grass, dock, and poke finally had to be cut by machine, a task the producers had hoped to avoid. They plan to mulch two sections of the garden with hay and two sections with black plastic. Soil fertility will be maintained with manure and the decaying hay. They will document soil inputs, changes in soil texture and fertility, results of treatments per crop, gross income and net income.

Aquaculture Conversion Model Emphasizing Poultry and Hog Facilities Re-Use and Recycled On-Farm Resources

PG96-35
Continuing Project
December 1998

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SARE grant **$6,000**

As vertical integration increasingly dominates the poultry and hog industries, more farmers undertake huge debt to erect single-use livestock confinement barns in order to contract for poultry or hog production. They often mortgage home and land to meet the integrator's demand for state-of-the-art facilities in order to secure a contract. Then for a number of reasons, often beyond their control, growers find themselves with empty single-use buildings.

This grower seeks to develop a viable alternative use for livestock concentration facilities. Using empty hog barns, he will demonstrate a conversion strategy for indoor production of farm-raised fish. He will utilize climate-controlled former livestock barns to house fish tanks, made from readily available supplies, and raise fish as an alternative to livestock production. He will also use fish manure to fertilize cropland adjacent to fish production tanks.

Using on-farm and purchased materials, the producer will construct commercial fish tanks from sections of a disassembled galvanized grain bin and swimming pool liners. Tilapia, and possibly trout as the weather cools, will be raised in a closed recirculating aquaculture system. The system will capture fish manure by filtration and hold it in a sand-bed tank. The fish manure will be applied to adjacent cropland.

Identification of Cover Crops to Enhance Habitat for Specific Beneficial Insects

PG96-37
Continuing Project
December 1998

Farmers are reporting great success in California in their efforts to reduce both the need for insecticides and the repeated release of beneficial insects. They have accomplished this by developing plant mixes that attract and retain beneficial insects and by sowing and mowing these mixes at the appropriate times during the growing seasons.

There is great potential for similar programs in North Carolina. However, there is little information available in the region on relationships between specific beneficial insects and the appropriate plant species that would attract and retain them. The producer intends to develop this type of information. If successful, he believes that there would be great potential for local production of cover crop seed mixes and the consequent reduction in the use of insecticides.

The producer plans to develop information on selected cover crop species that can provide habitat for beneficial insects for vegetable production and a cotton - peanut rotation in North Carolina. He will also determine if inserting the selected cover crops into existing vegetable and/or peanut - cotton rotation increases the presence and activity of beneficial insects and reduces the need for intervention.

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SARE grant **$8,452**

Multiple On-Farm Use of Aquatic Plants and Animals

PG96-38
Continuing Project
December 1998

Many small farmers find it difficult to earn a living wage. Moreover, the increasing costs of farming and low return on capital make it difficult for new farmers to get started. The grower has designed a project that will help overcome these barriers by utilizing existing ponds and water sources to grow aquatic plants and animals.

Farms in the south often have ponds or water sources that are seldom utilized for growing cash crops. And many different aquatic plants have economic value as food for human consumption, animal fodder, and for sale as garden ornamentals. Furthermore, aquatic and bog plants are some of the best known filters for purifying water, and they also recycle nutrients. This is increasingly important for farms that raise livestock or have problems with nutrient leaching and runoff.

This project will recycle runoff from animal pens, and domestic greywater through a series of filter beds, utilizing aquatic plants to capture nutrients and cleanse the water. The grower will develop a duck/tilapia/aquatic plant system in which the ducks and tilapia eat the aquatic plants. In turn, the ducks and tilapia will fertilize the water and the aquatic plants. He will use some aquatic plants (water hyacinths and duckweed) as alternative feed for pigs and chickens. Lastly, he plans to market other aquatic plants as vegetables (duck potato, watercress, water spinach, water chestnut) and ornamentals (water lilies, lotus, water lettuce, bulrushes).

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SARE grant **$8,452**

Technical Assistance for Meat Goat Marketing

PG96-40
Continuing Project
December 1998

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SARE grant $ 8,900

The major cash crop in Owsley County, Kentucky is tobacco, and its production has been declining. A study conducted by the Kentucky Long Term Policy Research Center has predicted that in the 10 years from 1993 to 2003 tobacco production will decline by 41 percent.

A group of concerned citizens serving as the Owsley County Action Team joined together to study sustainable alternatives for their area. One alternative they identified was meat goat production and marketing in the eastern coastline region. The East Kentucky Goat Producers Association (EKGPA) was formed to further develop this alternative.

While the EKGPA is convinced the potential for meat goat production exists, there is little information about marketing available. Consequently, the EKGPA has decided that research into marketing is needed for meat goat production to be successful in Owsley County.

This producer organization intends to educate farmers and prospective farmers on meat goat production and marketing. They will demonstrate proper artificial insemination methods, selection of meat goat varieties, goat management and pasture management through field days and publications. They plan to network with, and visit, goat producers, marketers, slaughter houses and processing plants to learn about the latest meat goat management and marketing technology and potential markets.

The EKGPA will write and submit a series of newspaper articles describing their planned activities and invite participation. They will also conduct field days on artificial insemination and conduct pasture management demonstration projects. They will then analyze the data from pasture management demonstration projects. Following the data analysis they will conduct a field day on pasture management. They will also visit slaughter houses and processing plants in order to thoroughly understand market criteria they will have to meet.

Grazing Alternatives to Tall Fescue for Stocker Cattle

PG96-45
Continuing Project
December 1998

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SARE grant $9,982

Feeder/stocker cattle that come from the southeast sometimes have the stigma of being of low quality and having sub-optimal health. This is blamed on forages. Much research has been conducted on improving forage grasses in the south, but there have been varying degrees of adoption in upper middle Tennessee. This is often because forage species developed as alternatives for other regions of the country usually have higher costs and/or increased management requirements over the commonly used tall fescue.

Tall fescue provides excellent production in the fall and spring but leaves much to be desired in the summer. Due to fescue's ability to grow almost anywhere, many producers take an either/or approach and grow either all fescue or plant exclusively some other forage.

When stocker cattle are grazed locally on endophyte infected tall fescue during the summer months they generally exhibit reduced daily weight gains and a less desirable appearance. These cattle take longer to get started on rations at feedlots, have more health problems than those grazed on other forage, and receive discounted prices.

The producer has noticed that even a limited introduction of crabgrass into a local grazing system as an alternative to tall fescue has provided measurable improvement in marketability, summer weight gains, feedlot performance, and profitability. Crabgrass is economical to produce, adaptable, and naturally occurring. It has the potential to work well in rotations with wheat and ryegrass eliminating the need to tie up the land year-round to produce summer grazing as some other species require.

This producer intends to determine if a crabgrass (in summer) and wheat/ryegrass (in winter) forage for stocker cattle will reduce the cost of beef production and improve health, carcass quality and marketability over cattle grazed on (often endophyte infected) tall fescue in the southeastern United States.

Sustainability Starts at Home: Building Regional Self Reliance Through Agritourism

FS97-46
Continuing Project
December 1998

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SARE grant **$9,580**

During 1996, farmers in the eastern Kentucky counties of Lee, Wolfe, Owsley, Powell, Estill and Menifee, working with Commodity Growers Cooperative, formed the Archway Regional Tourism Association (ARTA). The goals of ARTA are:

- Serve as a resource for area farmers by providing information and assistance on cooperative advertising through signs, brochures and other marketing campaigns and business-plan development;
- Ensure that the economic benefits of farming and agricultural tourism are documented and disseminated to the public;
- Create partnerships, to accomplish their goals, with local, state and federal agencies.

Commodity Growers Cooperative, through ARTA, plans to increase markets for farm products with agricultural tourism marketing in eastern Kentucky. They will work with Natural Bridge State Park in Kentucky and other regional operations to promote sustainable agriculture by educating area farmers and consumers about:

- The value of locally and organically grown food, through events and promotions in cooperation with Natural Bridge State Park whose restaurant serves one-million visitors annually;
- Building community pride in agriculture and the region's resources through events that promote the beauty and character of the region's land, trees and mountains;
- Area agritourism opportunities—including Christmas tree farms, organic produce farms, horse farms for trail rides and other low-impact tourism and agricultural ventures—through educational and promotional materials developed through the project.

ARTA plans to conduct three major activities during the life of the project. The first activity will be to assist the Natural Bridge State Park Resort to purchase and serve locally and organically grown produce in its restaurant. For the second activity, ARTA will conduct a Fall Harvest Festival each year. The third activity proposed by ARTA will be a "Christmas in the Mountains" partnership program between area lodges and Christmas tree farmers. The program will feature tree sales and weekend activities.

Evaluation of Mycorrhizal Inoculation on Three Eastern North Carolina Christmas Tree Species

FS97-48
Continuing Project
December 1998

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SARE grant **$650**

The production of Christmas trees in eastern North Carolina depends on inputs of resources such as fertilizer, pesticides and, in some cases, irrigation water. Frequently, Christmas tree production is only marginally profitable because the costs of these inputs are prohibitively high.

These high costs seriously affect the sustainability of the standard of living of people dependent on Christmas tree income. Most Christmas tree growers in eastern North Carolina are not full-time producers, but use the income to supplement jobs or social security and retirement income. The producer plans to reduce his dependence on off-farm inputs to his Christmas tree operation through the use of mycorrhizal inoculation.

The term mycorrhizae describes a symbiotic relationship between fungi and plants, including trees. The fungus, commonly referred to as mycorrhizae, has been found to infect the roots of most pine tree species in the field. It aids in the uptake of water and nutrients, particularly phosphorus. In turn, the fungus receives food from the plant which uses the sun to make sugars—something the fungus can not do. The producer plans to inoculate his seedlings with mycorrhizae (mycorrhizal inoculation). He hopes to give them a head start on their eventual infection in the field and thereby lessen the need for fertilizers and other soil amendments as they are getting established.

Crop Production Systems for Nonchemical Control of Reniform Nematodes

FS97-49
Continuing Project
December 1998

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SARE grant $8,892

The reniform nematode is spreading rapidly in Alabama and is becoming an important constraint to cotton production. Monoculture production of cotton is partly to blame for the spread of this pest, and the consequent cost of chemical control is becoming prohibitive for many growers. In addition to the cost, chemical control is not a sustainable solution for many cotton growers. Because of this, alternative crops, grown in rotation with cotton, may offer a solution.

The velvet bean, which was a rotational crop grown extensively in Alabama from the late 1800's until the advent of cheap fertilizer and other agriculture chemicals in the 1940s, shows tremendous economic potential for rotation with cotton. In experimental plots, velvet bean has dramatically reduced populations of bad nematodes, increased populations of good nematodes, and helped control weeds. The velvet bean crop controls weeds partly by rapid growth that smothers weeds and partly, it is believed, through allelopathic properties.

This producer will pursue alternative control of reniform nematodes in a sustainable cotton production ecosystem using various crops in rotation with cotton. He will plant cotton to be grown respectively with corn, grain sorghum, velvet bean, velvet bean-corn and velvet bean-sorghum to determine if he can reduce the incidence of reniform nematodes.

Effects of Conservation Tillage on Water Quality in Southern Texas

FS97-50
Continuing Project
December 1998

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SARE grant $8,000

There is tremendous interest in conservation tillage systems in the Lower Rio Grande Valley in which Cameron County is located. Producers need on-site demonstrations as well as information on the costs and benefits of the systems. The usefulness of tillage alternatives in cotton and grain sorghum have not been previously examined in Cameron County nor has an economic analysis been performed on a management system that integrates reduced tillage practices with weed and insect management practices.

This producer organization plans to increase the efficiency of cotton and grain sorghum production and reduce production costs through conservation tillage practices that optimize soil moisture reserves and integrate weed and insect management practices. They will accomplish these goals by conducting the following activities throughout the project.

1.) They will compare the costs and benefits of conventional and pre-plant no-till systems for cotton and grain sorghum production in the subtropical climate of Cameron County.
2.) Throughout the project they will establish relationships between the effects of pre-plant tillage practices and crop residue management by looking at crop yield, soil moisture, weed control, time, labor costs and net returns.
3.) The effects of tillage systems on cotton growth and on insect and weed management throughout the crop production season will be determined.
4.) The effects of conservation tillage and conventional tillage on soil moisture reserves within the soil at different depths will be investigated.
5.) Water quality concerns will be addressed through the application of tillage, nutrient management, and crop management technologies that also will allow acceptable net returns for producers.

Effect of Different Application Rates of Swine Lagoon Effluent on Corn and Wheat

FS97-51
Continuing Project
December 1998

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SARE grant $2,3172

In recent years there has been a great deal of concern over the application of swine lagoon effluent to fields resulting in high concentrations of phosphorus, copper and zinc in the soil. The rates at which swine waste must be applied in order to provide sufficient nitrogen to the crop results in high soil levels of phosphorus, copper and zinc which can have negative effects on soil and water quality. The excess elements have become a problem because the crop can't take up all that is applied during the year and the excess runs off into rivers and streams or stays in the soil approaching toxic levels.

The majority of swine producers in North Carolina apply swine lagoon effluent to fields of grass to be used for grazing cattle or producing hay. It is the producer's belief that the nutrients in the effluent can be better utilized to fertilize grain crops grown in rotation.

This producer plans to determine the impact of a reduction in swine lagoon effluent application rates on phosphorus, copper and zinc concentrations in the soil. He also intends to determine the effect of lowered swine lagoon effluent, and nitrogen, applications on the profitability of producing corn and wheat.

Three five-acre plots will be laid out in a field adjacent to the swine operation. One plot will receive swine lagoon effluent at current recommended rates providing sufficient nitrogen for optimal production. The second plot will receive the effluent at a rate that provides adequate phosphorus for optimal production. The third plot will receive no effluent but will receive commercial fertilizers with nitrogen and phosphorus at optimal rates. Corn, soybeans and wheat will be grown on the plots during the three years of the project. Optimal effluent application rates will be based on the recommended needs of the crop being grown during the application cycle.

Sustainable Pumpkin Production in the Southeast

FS97-52
Continuing Project
December 1998

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SARE grant $4.655

The production of food and fiber with low off-farm inputs is one of the goals of sustainable agriculture. This producer will use a legume cover crop to supply most of the nitrogen demand of his pumpkins.

He plans to evaluate a pumpkin production system using a legume cover crop preceding pumpkins and to use cover crop residue to suppress weeds and to provide erosion control during pumpkin production. Water holding capacity should be increased as a result of the cover crop and residue.

In the fall, the producer plans to establish four test plots, each consisting of three rows of pumpkins. He will then use two varieties of clover with and without nitrogen. The following summer, before the pumpkins are seeded, biomass samples will be taken and the cover crops killed and turned under. Once the pumpkins mature they will be weighed and graded for overall quality.

Cool Season and Warm Season Grasses to Stabilize Erodible Soils and Increase Profitability

FS97-53
Continuing Project
December 1998

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SARE grant **$10,000**

A significant portion of farm income in the southern United States is derived from cattle. Current grazing strategies are primarily single-resource systems in which warm season grasses, wheat, or cool season grasses are utilized exclusively. However, a feature of some southern grazing systems is the utilization of wheat as a dual purpose (grazing/grain) crop.

These producers plan to integrate wheat into southern grazing systems to increase profitability and stabilize highly erodible soils. Changes in the Conservation Reserve program (CRP) and other price support systems present opportunities to increase the area planted to permanent pastures, to retain pasture lands in established grasses and to integrate these resources with wheat to provide a year-long source of high quality forage. Maintenance of land in warm and cool season species, particularly on highly erodible soils, will preserve soil, aid water quality and promote economic stability.

Cool season and warm season grasses will be planted in the spring. Wheat will be planted as soon after September 15 as soil moisture conditions allow. Grazing by stocker steers on the wheat pasture will be initiated as soon after planting as possible. Cool season pastures will be grazed by two sets of cattle at different times on the pasture. Cattle will be grazed on warm season grasses in early summer until cool season grasses are ready for grazing in the fall.

Forest Site Preparation with Swine

FS97-54
Continuing Project
December 1998

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SARE grant **$5,088**

The average cost for establishing a commercial timber stand in the piedmont and coastal areas of the South is $100 per acre. An outdoor swine operation may help to lower these costs and reduce the need for fertilization and chemical removal of undesirable vegetative growth. Swine raised in a forest environment may also benefit from the cooler temperatures provided under a forest canopy. There are over 4000 swine producers in North Carolina with herds less than 100 sows (67 percent of total swine operations). This project may provide valuable information for a large percentage of North Carolina swine operations.

The producer plans to determine if pigs raised under forest will improve the soil characteristics and fertility of a forested ecosystem and if pigs raised under forest will improve the long-term economic viability of small swine operations.

Marketable mature timber will be removed prior to the introduction of pigs. Five one-acre plots will be fenced off and five different stocking rates and animal weights will be investigated. An additional acre plot will serve as a control and seedlings will be planted after conventional site preparation in the third year.

Pig numbers will be adjusted according to the results desired and the ability of the ground cover to maintain nutrients from swine waste in test plots. Loblolly pine seedlings will be planted in the test plots after three years.

Overwintering Survival of Kentucky Honeybees

FS97-55
Continuing Project
December 1998

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SARE grant $5,283

The important role honeybees play in agriculture is known to most fruit and vegetable growers who require bees for pollination. However, the unfavorable economics of beekeeping leads some apiarists in the northern United States and Canada to kill their hives each year instead of trying to overwinter them.

Most beekeepers in Kentucky do not insulate their hives and lose approximately 45 percent of their bees during the winter months,. The goal of this project is to develop a sustainable system that allows the hives to survive through the winter.

The producer feels that small actions taken by the apiarist will reduce the current winter kill numbers and improve the overall strength of the colony going into the spring season. In the project he will look at two management practices that can easily be implemented by an apiarist. He plans to determine if insulating bee hives will increase overwintering survivability and to utilize a solar apparatus designed to vaporize menthol pellets in the winter. He will also administer the approved menthol treatment for tracheal mites in a way designed to combat hive losses due to them.

Managed Grazing System to Increase Sustainability

FS97-56
Continuing Project
December 1998

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SARE grant $2,630

Intensive grazing, when properly managed, removes animals from riparian areas, reduces weed competition and provides land areas for wildlife utilization. Although many experts have endorsed this concept, acceptance has been slow in Kentucky. Producers have little experience in the techniques and management required to accomplish it successfully.

This project is dedicated to educating thirty producers on the integration of resources and the benefits of intensive grazing. The Madison County Beef Cattle Association hopes that as the producers begin to utilize parts of the program, other producers will view the results and also begin moving toward managed grazing. Producers in surrounding counties will be encouraged to attend in order to broaden the scope of the project and to provide them the opportunity to develop their own programs.

This producer organization plans to teach beef producers the purpose, benefits and techniques for developing a managed grazing system and integrated resource management. They will gather together a committee of beef producers, extension, state and local NRCS, Berea College and Eastern Kentucky University personnel and develop a day-and-a-half, hands-on seminar in integrated resource management with a focus on management intensive grazing. The seminar will integrate classroom presentations with hands-on fence building, livestock water development, clipping and weighing forages and forage allocation to grazing animals.

The project will be used to implement a neighbor-to-neighbor outreach program which utilizes cooperating host farmers who then share their ideas and experiences with other farmers in the community. The host farmer will entertain visiting farmers one-by-one by appointment. Neighbor to neighbor outreach can be used to aggressively market rotational/intensive grazing not only to traditional grazing audiences but also to historically under served groups who will benefit from good land use.

Effect of Limited Environmental Controls on Shiitake Mushroom Production in the Southern Coastal Plain

FS97-57
Continuing Project
December 1998

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SARE grant **$9,990**

This producer will utilize oak wood, one of the South's most plentiful and renewable resources, to generate income for small farms. His project will also involve the use of unused poultry houses, to be able to manipulate temperature, in the production of high-quality Shiitake mushrooms in the Southern Coastal Plain

The primary difficulty in marketing Shiitake mushrooms in the summertime is the variability in quality due, in part, to climate. Buyers need a consistent source of good quality product in quantities they can depend on. In colder regions of the country, heating a wide range of strains for winter production is quite common. In areas where the temperature will stay below freezing for months at a time, productive logs are warmed indoors for approximately two weeks and then shocked with cold and irrigation. Afterward, a temperature range of 55 to 65 degrees Fahrenheit is maintained until the time of harvest. The producer will adapt this method to southern growing conditions in the winter.

The producer plans to determine the feasibility of limited environmental controls on Shiitake mushrooms grown on logs in the Southern Coastal Plain and to develop an energy and labor efficient method that would allow log producers to produce high-quality mushrooms during times of environmental stress. He will accomplish this by developing a production method utilizing an abandoned shed and an old Thermo-King refrigeration unit from a semi-trailer.

Economics of Extended-season Cut Flower Production

FS97-60
Continuing Project
December 1998

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Texas Specialty Cut Flowers

SARE grant **$8,100**

Specialty cut flowers have proven to be a viable alternative agricultural business in the central United States and specialty cut flower production works very well with sustainable agriculture practices. Cover crops, biological pest control, erosion control and addition of organic matter to the soil result in excellent crops at reduced production costs.

In central Oklahoma, the majority of specialty cut flower operations utilize field production with a growing season from May through September. However, the strongest selling season runs from October through May which includes the major holidays. Demand for cut flowers and foliage is particularly strong in November for Thanksgiving Day sales, February for Valentine's Day sales, and April/May for Easter and Mother's Day sales. If a cut flower operation is able to extend their season and produce during fall, winter, and spring, the year-round cash flow generated would mean greater success.

The producer will extend the production season during winter months by using minimally heated cold-frames reducing the use of natural resources for production. The cost of the green houses is being carried by the producer. She will grow cool season and warm season annuals in three greenhouse environments: heated (60-65 degrees F night); minimally heated (35 degrees F night) and unheated (ambient). One outdoor treatment will also be tried.

By producing in the ground in cold-frames rather than in traditional greenhouses, she plans to use less water, no liquid fertilizers (no nitrate and phosphate runoff) and no pesticides. An extended growing season will increase sales by allowing producers to grow crops which normally cannot be grown during the regular growing season because of heat, weather or pests.

Algae-based Winter Feed for Small-Scale Goat Farm

FS97-61
Continuing Project
December 1998

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SARE grant **$7,907**

Meat goat farming is rapidly becoming a growth industry in Georgia especially for small farmers. The difficulty in any successful meat goat operation is the ability to sustain a breeding herd throughout the (albeit short) winter in a cost effective manner. What the producer feels is needed is an alternative/supplemental source of feed that is able to at least partially sustain a pregnant or lactating animal through the winter when no browse is available. The feed source should provide good nutrition, be cheap to produce and require no chemical fertilizers or other chemical additives.

This producer will examine the suitability of farm-produced algal mats as a feed source for a goat herd throughout the winter. Algae, including the common blue green algae (cyanobacteria), are aquatic plants which have no roots, leaves, seeds, or flowers. Over half of all the photosynthesis on earth is carried out by algae and they produce oxygen as a by-product. Blue-green algae are known by several other names including "pond scum" and "slime". The algae can be encouraged to grow on a medium that is in ready abundance on any farm regardless of size. That medium is silage made from grass clippings. This combination of grass clipping silage and algae is referred to as algal mat. The most notable feature of these mats is that on a pound-for-pound basis they have higher percentages of protein, chlorophyll and Vitamin B complex than do regular agriculture plants.

The producer will construct two artificial ponds (2 meters by 20 meters each) out of wood and lined with heavy gauge plastic in an area that receives full sun. A third pond will be constructed on a farm in south Georgia to test the reproducibility of the results. Drying racks will be constructed out of wood and plastic screen.

Maximizing Corn Production in the Mountains of Southeast Kentucky

FS97-62
Continuing Project
December 1998

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SARE grant **$4,955**

No-till practices for soil conservation and split application of fertilizers are no longer new techniques. Nevertheless, it is estimated that only 30 percent of corn producers in southeast Kentucky are implementing them. It is also estimated that as many as 90 percent of producers in the remote areas this project will serve do not consult cooperative extension agents about fertilization practices and information on highest yielding cultivars for the area.

This producer organization project will involve producers who do not often consult with extension about the best practices for corn production. By working directly with producers, particularly marginal ones, the project will help them produce greater yields, preserve topsoil, increase efficiency and profits and be encouraged to continue with agriculture as a means of income for the area.

In this project, the producer organization intends to improve environmental quality by encouraging the use of no-till planting to reduce soil erosion on highly erodible land. They also plan to encourage economic sustainability by improving production on limited mountain region acreage. They will do this by utilizing the cultivar of corn best suited for production and storage in the area, conduct soil tests for appropriate fertilization and liming and demonstrate techniques for split application of nitrogen.

Sustainable Wheat Management Systems

FS97-63
Continuing Project
December 1998

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SARE grant **$9,344**

Usually, either wheat-fallow-wheat or wheat-fallow-sorghum-fallow-wheat (two crops in three years) systems are used in dry land production in the Oklahoma panhandle while continuous cropping systems are used in central Oklahoma. Gage, where the project is situated, is located in Ellis county and is central to these two areas. Consequently, the producer wants to evaluate the economic impact of annual cropping compared with fallow systems.

The producer intends to determine if wheat grain yield is lower in continuous wheat monoculture than in rotation and to determine whether the tillage system (no-tillage vs minimum or clean tillage) influences grain yields in continuous monoculture and rotation. He will also evaluate the amount of nitrogen (if any) a cover crop of Austrian winter peas contributes to subsequent wheat production.

The project consists of two experimental areas—one will be no-till and the other conventional till—within which eight wheat crop rotation systems (treatments) will be replicated four times in each area. Each treatment will be planted in plots that will be 30 feet wide by 60 feet long.

Evaluation of a Low-Cost, Innovative Ensiling System for Small to Medium Dairy Operations

FS97-64
Continuing Project
December 1998

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SARE grant **$10,000**

An increasing number of dairies are utilizing pasture as a major source of food to sustain profitable operations. However, few geographic areas can sustain pasture for the entire year. If high quality excess forage growth in pastures could be harvested and stored efficiently and economically, it would help meet nutritional needs during periods of limited forage.

Ensiling various crops, including those used for pasture, has been a viable on-farm alternative to meet forage needs for some time. However, silage is not practical on many farms because of the expense of storage and equipment requirements, effluent losses (a waste of nutrients and an environmental hazard), and the difficulty of blending silages to meet livestock nutritional needs.

The producer intends to address the above difficulties with a vacuum ensiling system. The system will allow limited equipment and structure requirements and the ability to ensile small amounts of forage to be harvested at any one time.

The planned forages will be ryegrass, alfalfa, bermuda grass and pearl millet because they are used on the producer's farm and they represent a winter annual, a cool season perennial, a warm season perennial and a summer annual respectively. The forage will be piled on plastic and sealed by rolling the edges together around PVC pipe. The rolled plastic will be held together by a C clip made from a piece of PVC pipe the same diameter as the pipe on which the plastic was rolled. A vacuum will be pulled on the plastic wrapped forage using an old milk vacuum pump.

Through preliminary trials the producer found that the ensiling process was satisfactory, the cows consumed the silage with no problems and milk production was maintained. The producer will determine how often to pull a vacuum, silage temperature, nutrient analysis and milk production and quality.

Vermicomposting of Coffee Pulp

FS98-65
New Project
December 1998

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SARE grant $6,800

Puerto Rico produces approximately 2800 tons of coffee annually, which results in nearly 40,000 tons of waste pulp by-products. This creates a potential for pollution because most of the coffee processing plants are located near springs, rivers, and lakes due to the large quantities of water used in the coffee production process,

Normally, the pulp is deposited near the processing plant, to be naturally composted for one or two years depending on the size of the pile and weather conditions. During that period leaching and runoff can occur. However, properly managed, this waste material could be developed into a soil amendment and a growing medium through vermicomposting.

Vermicomposting consists of using red earthworms *(Eisenia foetida)* to decompose and to enrich different substrates under controlled conditions. In Puerto Rico, vermicomposting using chicken manure and other by-products has been tried, but there is little information on vermicomposting of coffee pulp in Puerto Rico.

This project will look at the effects of vermicomposting and composting of coffee pulp in Puerto Rico. The project coordinators will study the effects of both composting strategies on selected soils. Lastly, they will attempt to identify potential users of vermicompost.

Adding Value to Kentucky Produce Through Season Extension and Market Development

FS98-66
New Project
December 1998

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SARE grant $8,670

Family farms in Kentucky are representative of similar farms throughout the South with the addition of one issue, dependence on a secure tobacco market. Kentucky has among the largest number of small farms in the region, with tobacco produced in 119 of the 120 counties in Kentucky. Attempts at farm diversification for Kentucky family farms are often met with marketing obstacles. In the face of failure with attempts to diversify, Kentucky farmers renew their dependence on the secure tobacco income generated once a year. In order to break this cycle of dependency, farm projects centering on diversification that include marketing development are vital.

This project proposes to add value to selected vegetable and specialty horticulture crops produced on a diversified family farm in central Kentucky by extending the production seasons and marketing window of specific horticulture products. Greenhouse production of vegetables will occur in existing tobacco greenhouses, so that there will be no expenses associated with new construction. This will result in greater year-round use of existing structures.

This project seeks to:
(1) extend the production season of specific horticulture products by using greenhouse production methods; and
(2) process pepper, tomato, sweet basil and other fresh market vegetable products by drying the product, packaging with vacuum sealing methods and developing a market for such produce items.

This project to add value will create experience in the production and marketing of packaged produce items. The goal is to ultimately achieve results that can be duplicated by other family farm operations seeking to diversify.

Feasibility of Indoor Culture and Production of Ornamental Goldfish

FS98-67
New Project
December 1998

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SARE grant $2,216

Red Cap Oranda, a fancy ornamental goldfish, is imported from Japan and China because it is not grown commercially in the United States. A favorite of retailers and hobbyists, this species (*Carassius auratus*) is subject to high mortality associated with the stress of overseas transport.

If these fish can be successfully cultured domestically for commercial distribution, rural employment opportunities would increase and dependence on foreign imports would decrease. Additionally, growing the Oranda domestically should save retailers and hobbyists thousands of dollars per year in transportation costs and lost fish.

The objective of the project is to build and operate an environmentally sound, cost-effective, closed-loop re-circulating system for the rearing of Oranda that can be adapted to both small and large-scale production.

Late Blight Suppression in Tomatoes Using Competing Fungi on Leaf Surfaces

FS98-68
New Project
December 1998

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SARE grant $5,800

Late blight (*Phytophthora infestans*) is a major problem for tomato production in the Southeast. It is by far the biggest problem with the production of organic tomatoes in Western North Carolina. This area is known for its tomatoes because the warm days and the cool nights allow fruit set to proceed through the summer when other areas are too hot to reliably set fruit. With the cool nights come foggy mornings and ideal conditions for fungus growth. Late blight can defoliate a tomato plant within a week. Conventional growers minimize this problem with a weekly or more frequent spray program. An organic spray (copper sulfate) serves as a protectant and is fairly effective on late blight but it is water soluble and must be applied after each rain. Recoating all leaf surfaces after each rain is impractical, not to mention the problem of copper buildup in the soil. Without some late blight treatment, organic tomato production is possible only about one year in five in an area known for its conventional tomatoes.

An alternative to conventional fungicides (or copper sulfate for organic producers) would improve the sustainability of agriculture in the Southeast. The approach of this project is to explore the colonization of leaf surfaces with benign microbial populations that will compete with late blight when it arrives in late summer. Several compost extracts will be tested for their ability to counter the effect of late blight on tomato leaf surfaces by providing benign microbial populations that will outcompete the late-blight microrganisms. If this alternative approach proves successful, spray programs could be cut back or switched to a more environmentally benign material. In addition to reducing off-farm inputs, this approach may allow organic growers to avoid the build-up of copper in agricultural soils.

Integrated Goat Management System for Fiber and Meat

FS98- 69
New Project
December 1998

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Extension

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Clem Ward
Oklahoma State University
Marketing Specialist

Bob Woo
Oklahoma State University
Extension Agronomist

SARE grant $10,000

Many producers in the five-county area around Okfuskee County, Oklahoma, are limited-resource part-time producers with less than 200 acres. A small-scale farming system that would allow these farmers to maximize their farm income is needed. Some farmers are attempting to develop a sustainable farming system through the use of grazed goats for meat and cashmere.

Internal parasites are one of the major causes of death in grazed goats. Anthelmintics are a major cost factor in raising goats since many operators de-worm their goats on a monthly basis. This project aims to reduce the use of, and expenditure for, anthelmintics and to use rotational grazing to help lower intestinal parasites in goats.

Seasonal legumes and rotational grazing will be used to reduce off-farm expenditures for forage and high protein supplements. Rotational grazing will also reduce the parasite load and decrease the frequency of anthelmintic use. When this is coupled with timed kid production, heavier kids and the "high-value" seasonal meat markets, the overall economic efficiency of the farming operation will be improved.

In this project, the producer intends to: (1) determine ways to efficiently harvest cashmere; (2) improve net return to producers from the marketing of "value-added" cashmere; (3) reduce off-farm expenditures for forage and high protein supplements; (4) improve economic efficiency of the farm enterprise; and (5) time kid production to capture "high-value" seasonal markets.

Red Plastic Mulch as an Alternative to Insecticides in Production of Seedless Watermelons

FS98-70
New Project
December 1998

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SARE grant $7,390

The principal insect pests that reduce yields of commercial plastic-culture seedless watermelon crops in the Southern Region are cucumber beetles, squash bugs and aphids. A key factor in successful production of the new seedless watermelons is introducing pollinators to assure an adequate fruit set. The problem many seedless watermelon growers face is that honey bees used for pollination are often killed by insecticide spray applications.

It is not feasible to stop spraying for insect control during the period when watermelon vines are in bloom and the pollinators are active. Cucumber beetles feed on the flower stamens and pistils, greatly reducing fruit set; and aphid populations can build up in a short time and transmit mosaic virus disease to a crop. Furthermore, the vines bloom and set fruit over a six week period and that is too long to delay insect pest control.

The vast majority of farmers in the Southern Region who grow watermelons using plastic mulch and trickle irrigation use black plastic. This is unfortunate because the insect pest species actually seem to be attracted to the black covered rows. Several entomologists have reported that crop rows covered with red plastic have a repellent affect on certain insect pests.

In this project, field research will be conducted in the use of red plastic mulch as a repellent to insect pests and as an alternative to insecticide spray applications in commercial production of seedless watermelons. Comparative research plots will be monitored throughout the growing season and yields will be measured to determine if red plastic can be used economically to reduce or eliminate insecticide spray applications in watermelons fields.

Workshop on Parasite Control Through On-Farm Fecal Studies

FS98-71
New Project
December 1998

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SARE grant $6,545

Among livestock farmers, the inexperienced and the experienced often share a lack of specific knowledge about the parasites of their animals. This is, in part, because they lack the means of evaluating the level of parasitism and the type of parasites that plague their animals. As a result, intervention becomes a guessing game that is often excessive and poorly timed. Because parasitism is a serious problem in the south, this lack of knowledge can lead to decreased profits due to animal losses, wasted feed, excessive chemical/veterinary interventions, lower reproductive and survival rates, lower market weights, decreased performance and overall lower quality of products. Additionally, as a result of parasite resistance to increasingly toxic anthelmintics, increased chemical use is required.

The use of on-the-farm fecal studies and knowledge of how to interrupt the life-cycle of parasites is of primary importance. Identifying and quantifying the parasites through fecal studies is a critical step. Knowledge of the life cycle of parasites, management of all resources to interrupt that life-cycle and interventions that are strategically planned for maximum benefit are a multi-pronged approach used by the grant recipients.

In this project, the grant recipients will conduct workshops to teach farmers how to conduct fecal studies which will save the cost of veterinary services to perform the same tests. Lower costs mean farmers can perform more frequent studies which will allow better control and more effective parasite intervention.

Microbial Input for Organic Production of Vegetables

FS98-72
New Project
December 1998

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Nature Farming Research & Development Foundation

SARE grant $9,039

The system of organic farming depends on recycling of leguminous and non-leguminous organic matter in crop rotations to supply nutrients and increase soil organic matter. This practice also minimizes weed, insect and disease infestations on a farm while reducing soil degradation and erosion.

Inoculation of seeds, or seedlings in nurseries, with particular species or strains of beneficial microorganisms (e.g., strains of rhizobia, azatobactor, micorrhizae, etc.) to build up their populations and enhance their beneficial effects is a well-known practice. This producer is interested in finding out if inoculating the soil with selected microorganisms that are physiologically compatible with one another may prove helpful.

The producer will test two treatments of soil inoculant that contain different mixtures of microorganisms. He will incorporate them into his usual organic practices and will also have a treatment consisting of his usual practices without any inoculant additions. He will determine whether the inoculants increase his crop yield and will also compare the costs to see if they are economically sustainable.

Developing a Dairy Hair Sheep: Assessing the Potentials

FS98-73
New Project
December 1998

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SARE grant **$4,377**

Dairy sheep are not commonly raised in the southeastern United States. However, there is a wide market for dairy products from sheep, especially where high quality cheeses are enjoyed. Furthermore, sheep milk has qualities that over the centuries have proven it to be excellent for cheese and yoghurt.

Because wool does not bring the prices that it once did, sheep owners are looking for other income sources. One answer is to develop a milking hair sheep. The producer raises Katahdin meat sheep which are a hair breed. They are developed from the St. Croix, a hair breed indigenous to the Caribbean. The producer noticed that some individuals in her herd seemed to be very heavy milkers with well-attached udders and good teats, comparable to modern grade dairy goats.

While it would be possible to promote this trait by selection within the breed, out-crossing is faster and carries the added benefit of hybrid vigor. The East Friesian is a high-producing dairy breed. It is known world-wide for its superior milking abilities. The producer plans to out-breed her Katahdin to the East Friesian hoping to strike a balance between the low-maintenance hair sheep and the highly inbred dairy sheep. She plans ultimately to produce an easily maintained and productive animal for low-input, part-time farmers.

Even though the producer can not produce a fully haired dairy sheep within the time allotted for this study, she plans to show it to be quite possible to breed an animal that may ultimately replace wooled milking sheep, even in commercial dairies. The data from the animals being milked in this study should give a clear idea of the potential.

Alfalfa Hay Production to Lower Soil Phosphorus Levels Caused by Animal Waste Application

FS98-74
New Project
December 1998

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SARE grant **$9,556**

Efforts to manage the nutrients contained in poultry waste have traditionally emphasized nitrogen (N) management in order to reduce or prevent nitrate contamination of groundwater. By basing waste applications on N alone, phosphorus (P) in the waste is applied at two to three times its recommended rate. As a result, excessively high concentrations of P are accumulating in many Georgia soils. Because of the abundance of concentrated poultry operations in Georgia, erosion and runoff from soils that have received high rates of P have the potential to threaten water resources.

Some researchers and extension agents have suggested that producers purchase and apply commercial N and harvest hay from fields with high P levels. The grass takes up the P which is removed from the site when the hay is harvested, thus lowering soil P content. While this is an environmentally sound practice, producers who have access to abundant supplies of poultry waste are reluctant to purchase N fertilizer. Alfalfa has been suggested as a solution to the problem.

Many fields with a history of animal waste application already have the high P and K levels that alfalfa requires. Fertility levels in many of these soils are so high that it should be possible to maintain high alfalfa yields for several years without inputs of K, and for many years without inputs of P.

In this project, the producer plans to grow alfalfa to help him remove excess P from soils. While other hay crops may remove slightly more P from the soil than alfalfa, few other crops offer the same degree of animal digestibility, drought tolerance and N-fixation in addition to high levels of P removal.

An Intensive Marketing Workshop for Growers and Ranchers

FS98-75
New Project
December 1998

The demand for sustainably-produced agricultural products is growing every year. For example, organic production is growing at twenty percent a year. However, discussions with produce managers in Texas grocery chains suggest that this rate of growth is either not true in Texas or that they, themselves, are not seeing enough Texas products.

Chefs, national food companies, and consumers all say there is not enough local sustainably-produced fresh vegetables, poultry and meat readily available in Texas. For example, much of the organic produce available in Texas at major grocery chains comes from California and other west coast states.

Seasonality of Texas produce can be one reason, but even in prime seasons consumers often complain about the lack of availability of sustainably-grown products at the same time farmers complain about the difficulty of making a living.

To help increase the availability of Texas-grown products in Texas, the Texas Organic Grower's Association (TOGA), a non-profit trade association, proposes to develop and sponsor intensive one-day workshops on marketing for current and potential sustainable growers/ranchers. The workshops will provide information on a wide range of potential markets and their requirements. The long-term goal of the workshops is to increase the number of sustainable agricultural producers and to make existing farmers more knowledgeable about markets for their sustainably grown products.

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HEB Grocery

Jeffrey's and Fresh Plant Cafe

South Tex Organics

Whole Foods Southwest

Texas Dept. of Ag.

Arrowhead Mills

SARE grant $7,561

Development of Low-input Practices for Rose Production

FS98-76
New Project
December 1998

Roses are typically grown in monocultures and are maintained through heavy use of inorganic fertilizers, pesticides, and fungicides. The producer inherited a monoculture of 400 Simplicity rose plants from her father. He had followed the conventional practice of spraying every 5-7 days for insect and disease control, tilled frequently for weed control, used soluble fertilizers, and depended on rainfall for watering the roses.

During the first season that she alone was responsible for the roses, the grower followed most of her father's practices, making what changes she could. For example, she tried using a baking soda solution for black spot, and instead of tilling she used a leaf mulch.

The producer would like to continue growing the roses since they represent a significant investment and since her father had established a solid niche for his fresh-cut roses at the Henderson County Curb Market. She will use her Producer Grant to develop a series of practices to determine if sustainable agriculture practices can effectively control pests and diseases, suppress weeds, and provide sufficient nutrients and moisture for roses.

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SARE grant $2,690

Test Marketing and Financial Analysis of Fresh Cut Flowers

FS98-77
New Project
December 1998

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Both Virginia CES

SARE grant **$5,416**

Information about the economics and marketing of fresh cut flowers is not always available to small and part-time farmers who are considering establishment of fresh cut flower enterprises. When beginning growers attempt commercial production of fresh cut flowers, they often have to discover this information for themselves.

The producer plans to provide information about the economics and marketing of twelve species of fresh cut flowers through a case study of one small-scale commercial operation. He will gather and disseminate information about the following aspects of a fresh cut flower business.

A. All costs of production including land, labor, machinery operation, storage and supplies;
B. production yields for twelve species of fresh cut flowers;
C. all marketing costs including packing, transportation, promotion and sales;
D. grading standards and procedures for each of the twelve cut flower species;
E. price sensitivity for each of the twelve species within both retail and wholesale markets;
F. marketing procedures used to accomplish both retail and wholesale sales;
G. actual gross income and net income earned from each of the twelve flower species.

The species to be grown and sold will include gladiolus, asters, annual statice, liatris, gypsophila, tall phlox, yarrow, Asiatic lilies, celosia, zinnias, German statice and lavender. The information on the production and marketing of these species will be made available to other farmers throughout the Southern Region.

Corn Syrup as a Replacement for Mepiquat Chloride to Reduce Vegetative Growth in Cotton

FS98-78
New Project
December 1998

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SARE grant **$2,224**

Plant growth regulators are applied to cotton to reduce the vegetative growth of the cotton and encourage reproductive growth. Reducing growth can increase yield and decrease the occurrence of some diseases and difficulties in harvesting. The common product used is Pix (mepiquat chloride).This product is expensive and can cause reductions in yield during extremely dry seasons.

Several organic growers have started to use high fructose corn syrup, or other sugar products, to replace Pix. These products are less toxic and less expensive. However, little experimentation has been done to document the effectiveness of sugar syrup as a cotton plant growth regulator. If this alternative to Pix works, sustainability of farms would be increased by reduction in the cost of production by approximately $8.00 per acre.

In 1996, the producer received a Producer Grant to fund research into alternatives to conventional chemicals in the peanut and cotton rotation, including the use of fructose as a cotton growth regulator. As a result of this new producer grant, three of the participating farmers will eliminate the use of in-furrow insecticides on their peanuts this year, and approximately 10 producers not associated with the original grant will test eliminating the in-furrow insecticide. However, the results of the test of high fructose corn syrup were mixed. The producer thought that the high-fructose corn syrup would work better if applied earlier, and with more frequent, smaller applications.

In this project the producer will perform careful application of high-fructose corn syrup and design the research to answer questions that he left unanswered in his earlier research. He will coordinate the use of the high-fructose corn syrup on five farms, side by side with pix and an untreated check.

Demonstration of a Low-Input Diversified Small Farm Operation

FS98-79
New Project
December 1998

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Many small and limited-resource farmers are interested in learning of successful practitioners of sustainable agriculture. Through utilization of the whole farm concept these farmers will help to prevent damage to the soil, reduce waste material and help the farmer to increase his/her profit.

In this project, the producer will organize a team of agricultural support agencies to develop a whole farm management plan (holistic management plan). They will develop a plan to examine major biological systems involved in agriculture production and farm living. Emphasis will be placed on: green manure, soil, crop rotation, interseeding, composting, minimum and no-till, manure, controlled grazing and Integrated Pest Management (IPM)

A team of extension economists will develop a profile of the producer's farm. The profile will include the following:

1. Enterprise mix;
2. Family goals and values;
3. Income sources other than farm;
4. Farm cultural practices employed;
5. Enterprise budgets and accounting;
6. Resource Inventory;
7. Short and long-term plans.

The producer will also collaborate with South Carolina State University Extension to develop an educational program for youth and adults that will be centered around farm tours during stages of crop growth and pre-harvest. Educational programs will focus on sustainability. Record keeping will be a major component of the educational program with emphasis placed on both hand written and computerized records.

SARE grant $9,200

Establishment of a Grazing Management School for Producers

FS98-80
New Project
December 1998

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The lack of proper grazing management is a common and widespread problem on pastures and other grazing lands in the South and especially in Alabama. Cattle producers, as a group, have done a good job with cattle production and management practices but have done a poor job of grazing management. As a result, use of southern forage resources and grazing lands has not proceeded in a sustainable manner.

Lack of proper grazing management results in reduced productivity and vigor of the forage resource. Furthermore, depending on the forage species, improper grazing practices may result in loss of the stand. Grazing that is not managed will severely restrict leaf growth of the forage plants. Above-ground leaf area is directly proportional to the quantity of roots below ground; poor leaf cover means poor root development.

Rotational grazing management systems that are based on a rigid time table of grazing and rest periods without the producer having a knowledge of practical applications of plant physiology will ultimately result in overgrazing and a failure of the grazing system when growth rates change. This has been a common problem with rotational grazing systems in Alabama and other southeastern states.

This producer organization proposes to train producers in the basic concepts of proper rotational grazing management through the establishment of a grazing management school. They will conduct a grazing management school where producers will receive two to three days of basic information, as well as the opportunity to see grazing principles demonstrated. Producers will also have the opportunity for a hands-on application of the information. This will be an effective opportunity to present rotational grazing as a sustainable system for managing grazing and forage resources.

SARE grant $9,760

Soil Nutrient Balancing in Vegetable Production

FS98-81
New Project
December 1998

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SARE grant $7,325

Sufficient available calcium (Ca) is essential for a healthy soil microbiota, as well as crop vigor and disease resistance. Low soil Ca levels and unbalanced ratios of exchangeable Ca, magnesium (Mg), and potassium (K) may constrain sustainable vegetable production in Virginia and neighboring states. Some say that even in the absence of crop Ca deficiency, the low Ca:K or Ca:Mg ratios in many Virginia soils may cause a loss of soil tilth, increased compaction, poor aeration and reduced microbial and earthworm activity.

Soil acidity is often treated with dolomitic (high-Mg) limestone, which may exacerbate a low Ca:Mg ratio. Potential benefits, to vegetable crops, from correcting this imbalance have yet to be explored or demonstrated.

This producer association proposes to establish experimental plots at five farms in Virginia and eastern Tennessee to document and illustrate the effects of differing soil Ca:Mg ratios on soil health and vegetable crop nutrition, yield and quality. Two experimental soil amendment regimes, designed to maintain different Ca:Mg ratios, will be implemented in adjacent plots at each farm. Throughout the experiment, each participating grower will keep records of inputs, crops grown, and observations of soil conditions and crop vigor. Care will be taken to ensure that all plots on a given farm are planted to the same cropping sequence.

Organic Speciality Lettuce Production in Tobacco Greenhouses

FS98-83
New Project
December 1998

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Johnny's Selected Seeds

SARE grant $7,455

Tobacco farmers in the Southeast face uncertainty over the future of the quota system and a decreasing share of the world market. International competition, higher taxes, smoking restrictions, and public attitudes will likely limit profitability, eliminate small producers and initiate changes in many rural communities.

A large majority of tobacco plants are grown in greenhouses. As a result of the decrease in the tobacco quota in 1998, there is a significant amount of unused greenhouse space. Utilizing this space could help farmers make the transition from tobacco to other high value crops.

The producer plans to utilize existing greenhouse space and equipment that was formerly used to grow tobacco plants, to grow specialty lettuces. Float beds, float trays, seeders and tray filling devices, used for tobacco, could by used as is or with minor adaptation. He plans to develop a growing, harvesting and marketing system for the specialty lettuces. The system will be "cut and come again" with three cuttings anticipated before reseeding.

The speciality lettuces (e.g. bibb, greenleaf, Lollo Rosso, red oakleaf) would be grown organically and harvested as baby greens for salad mixes. Competitive advantages that would allow market entry are locally grown produce, organic, freshness, good shelf life and proximity to market. Target markets for sales are specialty food stores, small chain stores, and up-scale restaurants in urban areas.

Administrative Council

1998 Membership

Jill Auburn
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Washington, DC

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Tony Smith
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Peggy Barlett
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Atlanta , Georgia

Harry Wells
Pollution Prevention Office
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Duties

The Southern Region SARE Administrative Council is responsible to the Secretary of Agriculture through the CSREES-ES partnership. Specific responsibilities are to:

* Appoint a regional host institution and regional coordinator subject to the approval of the USDA;
* Make recommendations to the USDA concerning research and education projects that merit funding;
* Promote sustainable agriculture research and education programs in the Southern Region;
* Establish goals and criteria for the selection of projects within the Southern Region;
* Appoint a Technical Advisory Committee for evaluation of proposals for projects to be considered for funding
* Review and act upon the recommendations of the Technical Advisory Committee and coordinate its activities with the host institution;
* Prepare and make available an annual report concerning Southern Region activities in sustainable agriculture.

Membership

Terms of membership are for three years, with the option to serve more than one term. The elected membership of the Administrative Council includes:

* Farmers/ranchers practicing sustainable agriculture, including farmers/ranchers representing Best Utilization of Biological Applications and representing Integrated Management Systems;

* Nonprofit organizations with demonstrable expertise in sustainable agriculture including organizations representing Best Utilization of Biological Applications and organizations representing Integrated Management Systems;

* Agribusiness with demonstrable expertise in sustainable agriculture

* Other persons knowledgeable about sustainable agriculture and its impact on the environment and rural communities.

* Representatives are appointed from the following:

USDA Agriculture Research Service
USDA Cooperative State Research Education and Extension Service
US Environmental Protection Agency
Natural Resource Conservation Service
State agency representing sustainable agriculture
State agricultural experiment stations
State Cooperative Extension Services
US Geological Survey
SARE PDP Leadership Committee (as of 1999)

Technical Advisory Committee for Research and Education Grants

Duties

The primary goal of the committee is to provide guidance to the Southern Region SARE program concerning the technical merit of proposals and projects. The committee provides recommendations for funding based on technical merit through the Project Review Committee to the Administrative Council.

* Evaluate preproposals and full proposals submitted to the SARE program.

* Participate in project and program reviews.

* Work with the Project Review Commmittee and Host Institution on developing appropriate proposal and project evaluation guidelines.

Membership

Members are appointed for one year by the Administrative Council from the following sectors:

* Farmers/ranchers who practice sustainable agriculture, including farmers/ranchers representing Best Utilization of Biological Applications and representing Integrated Management Systems;

* Nonprofit organizations with demonstrable expertise in sustainable agriculture including organizations representing Best Utilization of Biological Applications and organizations representing Integrated Management Systems;

* Agribusiness with demonstrable expertise in sustainable agriculture

* Representatives from the following:
  - USDA Agriculture Research Service
  - USDA Cooperative State Research Education and Extension Service
  - US Environmental Protection Agency
  - Natural Resource Conservation Service
  - State agency representing sustainable agriculture
  - State agricultural experiment stations
  - State Cooperative Extension Services
  - US Geological Survey

* Other persons knowledgeable about sustainable agriculture and its impact on the environment and rural communities.

1998 Membership

Viviana Carro-Figueroa
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Stafford Crossman
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Freddie Payton
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Robert Zabawa
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Alabama

Active Research and Education Projects

Project #	Project Title	Lead Institution	Project Coordinator	SARE Funds
LS93-53	Sustainable Whole Farm Grain/Silage Production Systems for the Southeast	Auburn University	Wayne Reeves	$ 240,639
LS95-60.1	Integration of Animal Waste, Winter Cover Crops, and Biological Antagonists for Sustained Management of Columbia Lance and Other Nematodes on Cotton	North Carolina State University	Kenneth Barker	$ 143,412
LS94-61	Integrating Sustainable Forestry into Whole Farm Management of Minority and Limited-Resource Landowners in Three Regions of Arkansas	Winrock International	Erin Hughes	$ 246,710
LS94-62	Intercropping Small Grains and Lupin for Sustainable On-Farm Utilization	Auburn University	Edzard van Santen	$ 143,151
LS94-63	Regional Center for Sustainable Dairy Farming	North Carolina State University	Steve Washburn	$ 180,497
LS95-65	Wildlife Enhancement	North Carolina State University	Peter Bromley	$ 98,205
LS95-67	The Development of Pasture-Based Swine Production Systems for Limited Resource Farms in the Mississippi Delta	Arkansas Land and Development Corporation	Bryant Stevens	$ 274,412
LS95-68	Using Farm Family Case Studies to Teach Sustainable Agriculture	University of Tennessee	Tim Cross	$ 146,630
LS95-69	Managing Soil Phosphorous Accumulation From Poultry Litter Application Through Vegetable/ Legume Rotations	Texas A&M	D.R. Earhart	$ 135,000
LS95-70	Effects of Organic and Chemical Fertility Inputs on Soil Quality In Limited Resource Vegetable Farms	Virginia Tech	Greg Evanylo	$ 184,319
LS95-72	Agronomic and Economic Benefits of Intercropping Bean with Banana	University of Puerto Rico	Lii-chyuan Liu	$ 98,845
LS96-73	Soil Conservation and Pest Management Impacts of Grass Hedges	USDA-ARS	S. Dabney	$ 137,352
LS96-74	Improving Integrated Resource Management Skills of Beef Producers	Oklahoma State University	D. Doye	$ 163,642
LS96-75	Developing Sustainable Crop Management Systems for Improving Production of Culinary Herbs in the Virgin Islands	University of the Virgin Islands	M. Palada	$ 143,529
LS96-76	Integration of Pastured Poultry Production Into Farming Systems of Limited Resource Farmers	Heifer Project International	S. Polson	$ 149,624

Active Research and Education Projects

Project #	Project Title	Lead Institution	Project Coordinator	SARE Funds
LS96-77	Development of Sustainable Cropping Systems for Seedless Watermelon and Fall Lettuce in Rotation with Green Manures	North Carolina A&T State University	M.R. Reddy	$ 182,751
LS96-78	Saving the Southern Legacy:Heirloom Plants and Local Knowledge for Profitable, Sustainable Agriculture.	University of Georgia	R.E. Rhoades	$ 152,817
LS96-79	Multi-Cropping Cattle and Watermelon in the Southern Plains.	Oklahoma State University	W. Roberts	$ 54,752
LS96-80	Implementation of Alternative Agriculture Strategies for Rural Community Sustainable Development Northampton County, Virginia	The Nature Conservancy	T. Thompson	$ 228,517
LS97-82	Sustainable Crop and Livestock Systems in the Texas High Plains	Texas Tech University	Vivien Allen	$ 222,125
LS97-83	The Hometown Creamery Revival	Dairy Farm Cooperators	Vicki Dunaway	$ 145, 474
LS97-84	Regionally Centered Sustainable Agriculture System	Appalachian Sustainable Development	Anthony Flaccavento	$ 173,240
LS97-85	Impacts on Agricultural System Sustainability from Structural Change in Peanut, Poultry, Swine and Tobacco Production Systems	Center for Sustainable Systems	Hal Hamilton	$ 174,858
LS97-86	Equal Access to Agricultural Programs and Opportunities	Land Loss Prevention Project	Savi Horn	$ 151,290
LS97-87	An Integrated Vegetable Production, Postharvest and Marketing System for Limited-Resource Farmers in South Georgia	University of Georgia	Freddie Payton	$ 134,800
LS97-88	Producers Assessment of Sustainable Land Management Practices to Project Water Quality	USDA-ARS Southern Piedmont Conservation Research Center	Jean Steiner	$ 198,864 (SARE) $ 30,000 (ACE)
LS97-89	Integration of Freshwater Prawn Nursery and Growout System Into Diversified Farm Systems	Kentucky State University	James Tidwell	$ 155,197
LS98-90	An Integrated System of Organic Food Production and Urban Food Waste Recycling Using On-Farm Anaerobic Digestion and Fertigation	Full Circle Solutions	Anne Barkdoll	$ 142,623
LS98-91	Development of Decision Support Systems for Improvement of Silvicultural Practices on Farm-Based Non-Industrial Private Forests	North Carolina State University	Stephen Colbert	$ 26,204
LS98-92	Development of Sustainable Cropping Systems for Canola on Limited-Resource Farms in Alabama	Alabama A&M University	Sabry Elias	$ 124,488
LS98-93	Accountability at Local, State and Federal Levels for Impacts of Agricultural Conservation Practice on Water Quality	USDA-ARS	Dwight Fisher	$ 223,322

Active Research and Education Projects

Project #	Project Title	Lead Institution	Project Coordinator	SARE Funds
LS98-94	A Model for Long-Term, Large-Scale Systems Research Directed Toward Agricultural Sustainability	North Carolina State University	J. Paul Mueller	$ 256,604
LS98-95	Intergenerational Education for Sustainable Agriculture	College of Charleston	Keith Richards	$ 176,240
LS98-96	Integrating Farmer-Driven, Value-Added Enterprises Into Sustainable Agriculture Systems	Sustainable Food Center	Keith Richards	$ 120,590
LS98-97	Introducing Alternative Crops into Traditional Cotton-Grain Farming to Aid Transition to Freedom-to-Farm Agriculture	Texas A&M Extension	Roland E. Roberts	$ 114,279
AS93-9	Using Soldier Flies as a Manure Management Tool for Volume Reduction, House Fly Control and Feedstuff Production	University of Georgia	Craig Sheppard	$ 49,100 (ACE) $ 2,150 (SARE)
AS94-16	Development of Guidelines for and Demonstration of Efficient Treatment of Swine Lagoon Wastewater by Constructed Wetlands	Auburn University	Tom A. McCaskey	$ 130,325
AS95-18	Wildlife Enhancement and Education as Catalyst in the Widespread Implementation of Sustainable Ag Practices (Also LS 95-65)	North Carolina State University	Peter Bromley	$ 75,000
AS95-19	Biological Control Methods for Citrus Rust Mites and Spider Mites on Florida Citrus Utilizing Predaceous Arthropods (Also LS95-66)	University of Florida	Carl Childers	$ 75,000
AS95-21	Reduced Risk Cockroach Control in Confined Animal Production	North Carolina State University	Coby Schal	$ 38,840
AS96-25	Controlling Cheat and Annual Ryegrass in Small Grains Using Novel Crop Harvesting Technologies	Oklahoma State University	T.F. Peeper	$ 125,000 (ACE) $ 83,624 (SARE)

Active Producer Projects

Project #	Project Title	State	Project Coordinator	SARE Funds
PG95-21	Pecan IPM Using Black-Eyed Peas as a Trap Crop	Texas	Kyle Brooksheir	$4,000
PG95-25	Development of Potting Soil Mixes from Local Wastes	Florida	Steve Garrison	$9,600
PG95-26	Testing the Efficacy of Alternative Methods of Whitefly Control in Organic Vegetable Production	Florida	Rosalie Koenig	$5,200
PG95-27	High-Value, Small-Scale Sustainable Vegetable and Fruit Production Methods	North Carolina	Larry & Judy McPherson	$9,612
PG95-28	Improving Tropical Soils by Utilizing Organic Wastes	Puerto Rico	Andre Sanfiorenzo	$10,000
PG95-33	Cover Crops in Integrated Vegetable Production Systems	South Carolina	Charles Wingard	$ 9,285
PG96-35	Aquaculture Conversion Model for Poultry and Hog Facilities Emphasizing Building Re-use and Recycled On-Farm Resources	North Carolina	Benny Bunting	$ 6,000
PG96-36	Native Warm Season Grasses as Hay Source for a Family Operated Goat Dairy	Texas	Lee B. Dexter	$ 9,640
PG96-37	Identification of Cover Crops to Enhance the Habitat of Specific Beneficial Insects in Sustainable Production Systems	North Carolina	Kenny Haines	$ 8,452
PG96-38	Multiple On-Farm Use of Aquatic Plants and Animals	North Carolina	Harvey Harman	$ 9,575
PG96-39	Group Strategic Alliances for Carroll County Feeder Calves	Kentucky	Tim Hendrick	$ 10,000
PG96-40	Technical Assistance for Meat Goat Marketing	Kentucky	Neil Hoffman	$ 8,900
PG96-44	Alternatives to Chemicals in the Peanut Cotton Rotation	North Carolina	Hubert Morris	$ 9,366
PG96-45	Grazing Alternatives to Tall Fescue for Stocker Cattle	Tennessee	Chris Pitts	$ 9,982
FS97-46	Sustainability Starts at Home-Building Regional Self Reliance through Agritourism	Kentucky	Karen Armstrong-Cummings	$9,580
FS97-48	Evaluation of Mycorrhizal Innoculation on Growth and Quality of Three Eastern North Carolina Christmas Tree Species	North Carolina	Dorsey Daniel	$ 650

Active Producer Projects

Project #	Project Title	State	Project Coordinator	SARE Funds
FS97-49	Crop Production Systems for Nonchemical Control of Reniform Nematodes	Alabama	Richard Edgar	$8,892
FS97-50	Effects of Conservation Tillage on Water Quality in Southern Texas	Texas	Charles Eubanks	$8,000
FS97-51	Effect of Different Application Rates of Swine Lagoon Effluent on Corn and Wheat	North Carolina	John Hart	$2,317
FS97-52	Sustainable Pumpkin Production in the Southeast	Alabama	Dwight N. James	$4,655
FS97-53	Cool Season and Warm Season Grasses to Stabilize Erodible Soils and Increase Profitability	Texas	David Kearney	$10,000
FS97-54	Forest Site Preparation With Swine	North Carolina	Thomas Livingston	$5,088
FS97-55	Overwintering Survival of Kentucky Honeybees	Kentucky	Mark Q. Lee	$5,283
FS97-56	Managed Grazing System to Increase Sustainability	Kentucky	Evan McCord	$2,630
FS97-57	Effect of Limited Environmental Controls on Shiitake Mushroom Production in the Southern Coastal Plain.	Florida	Charles McRae	$9,990
FS97-58	Evaluation of an Alternative Low-Input Production System For Fresh Market Tomato	Georgia	Greg and Dale Murray	$5,109
FS97-60	Economics of Season Extension Cut Flower Production	Oklahoma	Vicki Stamback	$8,100
FS97-61	Algae-Based Winter Feed for Small-Scale Goat Farm Operations	Georgia	Rosemarie Szostak	$7,907
FS97-62	Maximizing Corn Production Through Tillage Methods, Cultivar and Fertilization in the Mountains of Southeast Kentucky	Kentucky	David Teague	$4,955
FS97-63	Sustainable Wheat Management Systems	Oklahoma	Curtis Torrance	$9,344
FS97-64	Evaluation of a Low-Cost Innovative Ensiling System for Small to Medium Dairy Operations.	Alabama	David and Leianne Wright	$10,000
FS98-65	Vermicomposting of Coffee Pulp	Puerto Rico	Noel Avila-Velez	$6,800
FS98-66	Adding Value to Kentucky Produce Through Season Extension and Market Development	Kentucky	Ann Bell	$8,670
FS98-67	Feasibility of Indoor Culture and Production of Ornamental Goldfish	Florida	Robert Draughon	$2,216
FS98-68	Late Blight Suppression in Tomatoes Using Competing Fungi on Leaf Surfaces	North Carolina	Tom Elmore	$5,800

Active Producer Projects

Project #	Project Title	State	Project Coordinator	SARE Funds
FS98-69	Integrated Goat Managment System for Fiber and Meat	Oklahoma	Claud Evans	$10,000
FS98-70	Red Plastic Mulch as an Alterntive to Insecticides in Production of Seedless Watermelons	South Carolina	John Frazier	$7,390
FS98-71	Workshop on Parasite Control Through On-Farm Fecal Studies	North Carolina	Susan Gladin	$6,545
FS98-72	Microbial Input for Organic Production of Vegetables	Georgia	Skip Glover	$9,039
FS98-73	Developing a Dairy Hair Sheep: Assessing the Potentials	Virginia	Amy Hayner	$4,377
FS98-74	Alfalfa Hay Production to Lower Soil Phosphorus Levels Caused by Animal Waste Application	Georgia	Keith Boozer	$9,556
FS98-75	An Intensive Marketing Workshop for Growers and Ranchers	Texas	Sue Johnson	$7,561
FS98-76	Development of Low-input Practices for Rose Production	North Carolina	Jaqueline Jones	$2,690
FS98-77	Test Marketing and Financial Analysis of Fresh Cut Flowers	Virginia	Emmett Lowe	$5,416
FS98-78	High Fructose Corn Syrup as a Replacement for Mepiquat Chloride to Reduce Vegetative Growth in Cotton	North Carolina	Hubert Morris	$2,224
FS98-79	Demonstration of a Low-Input Diversified Small Farm Operation	South Carolina	Theodore Nesmith	$9,200
FS98-80	Establishment of a Grazing Management School for Producers	Alabama	Kenneth Rogers	$9,760
FS98-81	Soil Nutrient Balancing in Vegetable Production	Virginia	Mark Schonbeck	$7,325
FS98-83	Organic Speciality Lettuce Production in Tobacco Greenhouses	North Carolina	John Vollmer	$7,455

Professional Development Program Strategic Plan

Vision Statement

A partnership of people working in and concerned about agriculture, sustaining a responsive network of healthy farms, healthy products, healthy communities and a healthy environment.

Mission Statement

To provide leadership, foster partnerships and facilitate the personal and professional growth of agricultural professionals who will work towards sustaining an economically viable, socially responsive and environmentally regenerative agriculture for the southern region.

Goals

- **To create and sustain a leadership committee which works productively with the management team and serves as a model of strength in diversity, systems thinking and group creativity and whose actions receive strong support from project stakeholders.**

- **To provide a guiding agenda, coordination and support of training assistance to state coordinators as they achieve their state's training goals.**

- **To communicate the mission, goals and outcomes of the PDP to all agricultural professionals in the region.**

- **To foster and provide sustainable agriculture training opportunities for extension agents, NRCS personnel and other agricultural professionals.**

- **To maintain a reporting information system and communicate annual evaluations of the PDP to program clientele, partners in training and the SARE/ACE Administrative Council.**

- **To foster increased networking and joint training activities between individuals and organizations involved in sustainable agriculture training.**

- **To promote the personal and professional development of agricultural professionals.**

- **To accept, respect, and promote diverse concepts and principles.**

State Sustainable Agriculture Coordinators

State sustainable agriculture coordinators are responsible for developing state strategic plans to address the most urgent training needs for ag professionals. Each year $10,000 is available to each state for implementing that plan. State plan activity reports are on pages 61-63

State sustainable agriculture coordinators also provide input to the Leadership Committee on programming priorities and approaches.

Alabama
Charles B. Ogburn
Cathy Sabota
William Hodge

Arkansas
Tom Riley, Jr.
Lott Rolfe, III

Florida
Mickie Swisher
Cassel Gardner

Georgia
Mark Risse
Mark Lattimore

Kentucky
Curtis Absher
Marion Simon

Louisiana
Dale Pollet
Adell Brown, Jr.

Mississippi
Malcolm Broome
William B. Patton

North Carolina
J. Paul Mueller
John M. O'Sullivan

Oklahoma
Ross O. Love
Nelson Escobar

Puerto Rico
Luis R. Mejia-Maymi

South Carolina
Calvin Schoulties
Fred Broughton

Tennessee
Ray Humberd
Alvin Wade

Texas
Charles Stichler
Nathaniel Keyes

Virginia
James W. Pease
Mitchell Patterson, Jr.

Virgin Islands
Carlos Robles

Southern Region PDP Leadership Committee

Representing a cross section of professional agricultural interests, the Leadership Committee sets program direction and policy for PDP based on input from State Sustainable Agriculture Coordinators, the Administrative Council, the Management Team and other stakeholders.

Samuel Bass
Clemson University CES
South Carolina

Zona Beaty*
NRCS
Alabama

Darryl Birkenfeld
Promised Land Network
Texas

Malcome Broome*
Mississippi State University
Mississippi

Archer Christian
Brackett's Farm
Virginia

Cynthia Connolly**
Producer
Florida

Charles Griffith*
Producer
Oklahoma

Greg Henson
University of Kentucky CES
Kentucky

Savi Horne
Land Loss Prevention Project
North Carolina

Jim Joyner
Morningside Farms
Tennessee

Joe Judice
Producer
Louisiana

John Meetze **
NRCS
Alabama

Rebecca Perez-Rossello*
Harmony Farm
Puerto Rico

Jim Smith**
Good Earth Organics
North Carolina

Ken Staten*
Producer
Florida

Steve Carmichael
Administrative Council
representative

Hui Newcomb
Administrative Council
representative

*incoming
**outgoing

Management Team

The Management Team implements program decisions and coordinates program activities.

Roger Crickenberger
North Carolina State University
North Carolina CES

Jim Lukens
Appropriate Technology Transfer for Rural Areas
National Center for Appropriate Technology
Arkansas

John O'Sullivan
North Carolina A&T State University
North Carolina CEP

Rosanne Minarovic
Extension Associate
North Carolina State University
North Carolina CES

Active Professional Development Projects

Project #	Project Title	Lead Institution	Project Coordinator	SARE Funds
LST96-9	Management Intensive Grazing	University of SW. LA	H. Alan DeRamus	$ 97,223
LST96-10	Sustainable Small-Scale Agricultural Development Training Project	Southern University	Adell Brown	$ 25,701
LST96-11	Southern Gathering on Agricultural Problem-Solving	University of Kentucky	R.J. Hustedde	$ 52,000
LST96-12	Facilitating Farmer to Farmer Networks: An Experimental Approach	University of Florida	Marilyn E. Swisher	$ 80,997
LST96-13	Sustainable Agricultural Marketing through Collaborative Policy Development	Delta Land and Community, Inc.	James V. Worstell	$ 40,900
ES97-14	Southern Region Sustainable Agriculture Training Consortium	North Carolina State University	Roger Crickenberger	$ 232,599
ES97-15	Kentucky Cooperative Extension System Training Project	Kentucky State University	Marion Simon	$ 50,000
ES97-16	Developing Trained Professionals and Teaching Aids to Support Educational Programs Addressing Management of Stored Grain in the Southeast	University of Georgia	Steve Brown	$ 38,150
ES97-17	Overcoming Training Obstacles: A Realistic Cost-Effective Approach	South Carolina State University	Charles Artis	$ 10,000
ES96-18	The First Requirement of Agriculture Sustainability: Efficient Mangement of Available Resources	South Carolina State University	Charles Artis	$ 60,000
ES97-19	Nuisances in the Community: Training on the Issues and the Methods of Mediation	National Center for Ag. Law Res. and Info.	Jamie Simms Hipp	$ 56,000
ES97-20	State Training in Integrated Erosion Control Systems	Oklahoma State University	Gerrit Cuperus	$70,013
ES97-21	State Training Enhancement Project to Ensure Effective Sustainable Agriculture Training in Integrated Erosion Control Systems	Oklahoma State University	Gerrit Cuperus	$ 10,000
ES97-24	Barriers to Sustainable Agriculture Training in Oklahoma	Oklahoma State University	Derrell Peel	$ 10,000
ES97-25	Building Capacity in Sustainable Agriculture: A Comprehensive Training Program in Organic Farming Systems	North Carolina State University	Nancy Creamer	$ 97,500
ES97-26	Community Food Security & Marketing Capacity Development in Kentucky	Commodity Growers Cooperative	Karen Armstrong-Cummings	$ 79,970

Active Professional Development Projects

Project #	Project Title	Lead Institution	Project Coordinator	SARE Funds
ES97-27	Training Program Targeting Integrated Cow/ Calf Operation Management	Oklahoma State University	Steven Smith	$ 54,340
ES97-28	Grassroots Empowerment in Kentucky's Local Conservation Districts: Leadership Training on Sustainable Land and Water Quality Management Practices	Kentucky Division of Conservation	Stephen Coleman	$ 86,280
ES97-29	Implementing Tennessee's Strategic Plan for Sustainable Agriculture: Utilizing On-Farm Case Studies for Teaching Advanced Management and Marketing to Extension	University of Tennessee	Clark Garland	$ 10,000
ES97-30	Integrated Production of Sustainable Crops for Small Farmers in North Florida	University of Florida	Gary Knox	$ 8,375
ES97-31	Development of Sustainable Checksheet, Manual and Workshops	NCAT/ ATTRA	Ron Morrow	$ 69,936
ES97-32	Responding to Expressed Needs: Regional Training with Dairy Systems Manual and Software	University of Kentucky	Steve Isaacs	$ 48,500
ES97-33	Alternative Sustainable Agriculture Practices for Selected Crops in Puerto Rico Puerto Rico Extension Service,	University of Puerto Rico	Miguel Monroig-Ingles	$ 10,000
ES97-34	Multi-state, Value-added Team Building in the Northern Mississippi River Delta Region	Delta Land & Community, Inc.	Jim Worstell	$ 20,000
ES97-35	Integrated Strategic Plan for Sustainable Agriculture	University of Puerto Rico	Hipolito O'Farrill	$ 25,740
ES97-36	Sustainable Agriculture Training Initiative for Texas	Texas A&M	Nancy Roe	$ 70,136
ES98-37	Oklahoma Master Woodland Owners Program	Oklahoma CES	William Ross	$23,640
ES98-38	Motivating Teams for Enterprise Facilitation	Delta Land and Community	Jim Worstell	$96,000
ES98-39	Multi-Disciplinary Training on Pasture-Based Dairy Systems	North Carolina State University	Steve Washburn	$52,578
ES98-40	Grazing Management Training to enhance the Sustainability of Pasture-Based Beef Production Systems	North Carolina State University	Jim Green	$31,745
ES98-41	Training in Value Added Syrup Crops	Alcorn CES	William Patton	$99,912
ES98-42	Training in Agriculture Program (TAP)	Operation Spring Plant, Inc.	Dorothy Barker	$17,890

Index of 1998 Project Coordinators

Reports from completed projects

Final summaries are available from some projects that finished before 1998. For a free copy of any summary listed below contact Gwen Roland at (770) 412-4786

Biological Control and its Economics in the Southern United States (LS91-31)

Producing Vegetables in the South Using Low-input Sustainable Techniques: Collection and Analysis of a Database (LS91-32)

Reference Manual of LISA Resource Management Strategy: Crop Budgets for the Mid-South Region (LS91-33A)

Total Resource Budgeting of LISA Related Management Strategies (LS91-34)

Improved Nitrogen Use-Efficiency in Cover Crop Based Production Systems (LS91-35)

Pest Management and Orchard Floor Management Strategies to Reduce Pesticide and Nitrogen Inputs (LS91-36)

Low-Input Crop and Livestock Systems for the Southeastern United States (LS91-37)

Developing and Extending Minimum Input Strategies for Weed Control in Agronomic and Horticultural Crops (LS91-38)

Utilization of Winter Legume Cover Crops for Pest and Fertility Management in Cotton (LS94-40)

Organic Nitrogen Sources for Sweet Potatoes: Production Potential and Economic Feasibility (LS92-45)

Development of Cropping Systems for Nematode Management on Agronomic

and Horticultural Crops (LS92-46)

Farm Scale Evaluation of Alternative Cotton Production Systems (LS92-47)

Developing Environmentally Sound Poultry Litter Management Practices for Sustainable Cropping Systems (LS92-48)

Organic Soil Amendments of Agricultural By-Products for Vegetable Production Systems in the Mississippi Delta Region (LS92-49)

Participatory Assessment for Strategic Planning in Sustainable Agriculture Research and Education (LS92-50)

Warm-Season Forage Grasses as Rotations for Sustaining Profitable Peanut Production (LS93-51)

Utilization of Dairy Manure in Low-input, Conservation Tillage Animal Feed Production Systems (LS93-52)

Evaluation of a Low-Input, No-till, No-herbicide Continuous Grazing System for Dairy Cows (LS93-54)

Cover Crop Integration into Conservation Production Systems (LS93-55)

Disease and Insect Management Using New Crop Rotations for Sustainable Production of Row Crops in the Southeastern United States (LS94-57)

Post-CRP Land Management and Sustainable Production Alternatives for Highly Erodible Lands in the Southern Great Plains (LS94-58)

Developing Municipal/Farm Linkages for On-Farm Composting and Utilization of Yard Wastes (LS95-71)

An Integrated Technological and Marketing Strategy to Make Broiler Production More Sustainable (AS92-1)

Habitat Enhancement for Beneficial Insects in Vegetable and Fruit Farming Systems (AS92-2)

Integration of Natural Enemies for Management of the Sweet Potato Whitefly and Associated Disorders on Mixed-cropped Vegetables (AS92-3)

Poultry Litter as a Soil Amendment in Southern Row Crops: A Feasibility Study Based on Agronomic, Environmental and Economic Factors (AS93-10)

Waste Management System for Loafing Areas in Dairies (AS94-12)

Natural Enemies, Viral Insecticides and Improved Information Delivery for Management of Lepidopterous Pests in Transgenic B.t. Cotton (AS95-20)

Biological Control of Silverleaf Whitefly in Floriculture (AS95-22)

Increasing Acceptance of Low-Input Landscapes for the Southeast (AS95-23)

Development of Suitable Area-Wide Weed Management Practices for Improved Land Utilization (AS93-8)

Use of Poultry Litter or Manure for Root-Knot Nematode Management on Vegetables and Field Crops (AS93-11)

Assessing the Impact of Beneficial Insect Populations on Organic Farms (AS94-13)

Forage, Biomass and Biogas Integrated Systems for Animal Waste Management (AS94-14)

Identifying Pesticides Most Compatible with Parasites of the Citrus Leafminer (AS95-24)

No-Tillage Production of Transplanted Crops in High Cover Crop Residues (PG95-20)

No-Till Grain Production for Soil and Moisture Conservation (PG95-22)

Low-Input Sustainable Agriculture Short Course (PG96-42)

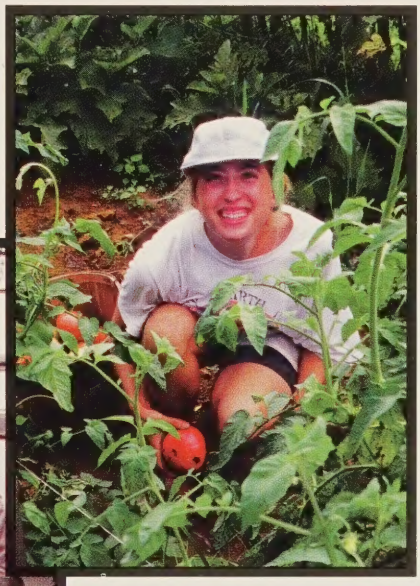
Index

U

V

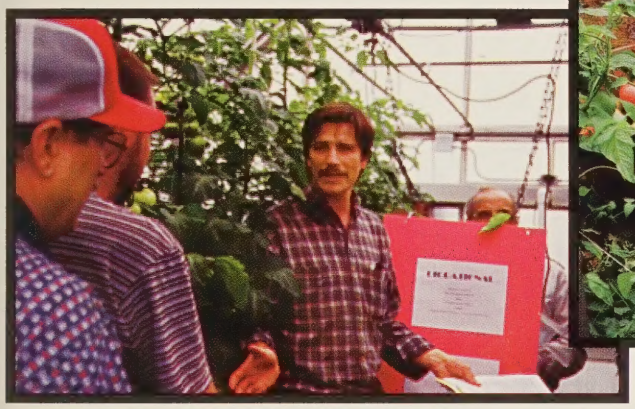
W

(Left) FFA student Brandon Smith helps an ARS employee install runoff collectors in a project where Georgia farmers and community volunteers are testing agricultural runoff into Rose and Greenbrier creeks to monitor the impact of various agricultural production systems. Photo by Dory Franklin. (LS97-88)



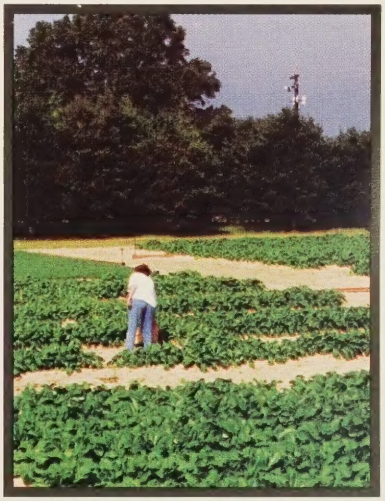
(Above) John Hickman explains value-added marketing of heirloom variety Hayman potato at a SARE workshop on Virginia's Eastern Shore. Photo by project coordinator Terry Thompson.(LS96-80)

(Left) Anna Prescott learned about farming from the ground up as an apprentice on two farms in the Appalachian Mountains. (LS97-84)



(Below) Turnip plots at a Texas A&M Research farm are part of a study about managing phosphorous accumulation from poultry litter application through crop rotations. Photo by Marty Baker. (LS95-69)

Frank Louws uses a field trip to Sunnyslope commercial greenhouse to teach greenhouse management. Approximately 50 agricultural professionals signed up to attend 14 two-day workshops in organic farming systems as part of a PDP project through NCSU. (ES97-25) Photo by Danielle Treadwell.



Freshwater prawns are weighed for sale straight from the Kentucky livestock pond where they were raised. The SARE project led by Kentucky State University has helped establish aquaculture in the state and is now evaluating the feasibility of an in-state prawn nursery or hatchery to help producers reduce stocking costs. Photo by project investigator James Tidwell. (LS97-89)

Acknowledgments

The Southern Region 1998 Annual Report was accomplished through a cooperative effort in keeping with the SARE philosophy. Writing, editing and design were done by Gwen Roland. Project summaries were written by the project coordinators except for the Producer Grant summaries which were written by John Mayne. Project photos were taken by project participants or Gwen Roland. Printing was done by Piedmont Impressions of Athens, Georgia.

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Many sustainable agricultural practices have been handed down through generations like favorite seed varieties.

Ernest Keheley (right), an 82-year old farmer cooperating with the Southern Seed Legacy Project, not only shared his memories, but also donated his lifetime collection of seeds for the benefit of future growers such as Alexander Peletz (front cover).

Modern data collection methods and accurate record keeping will make it even easier for experienced farmers to pass along their accumulation of knowledge. (LS96-78)